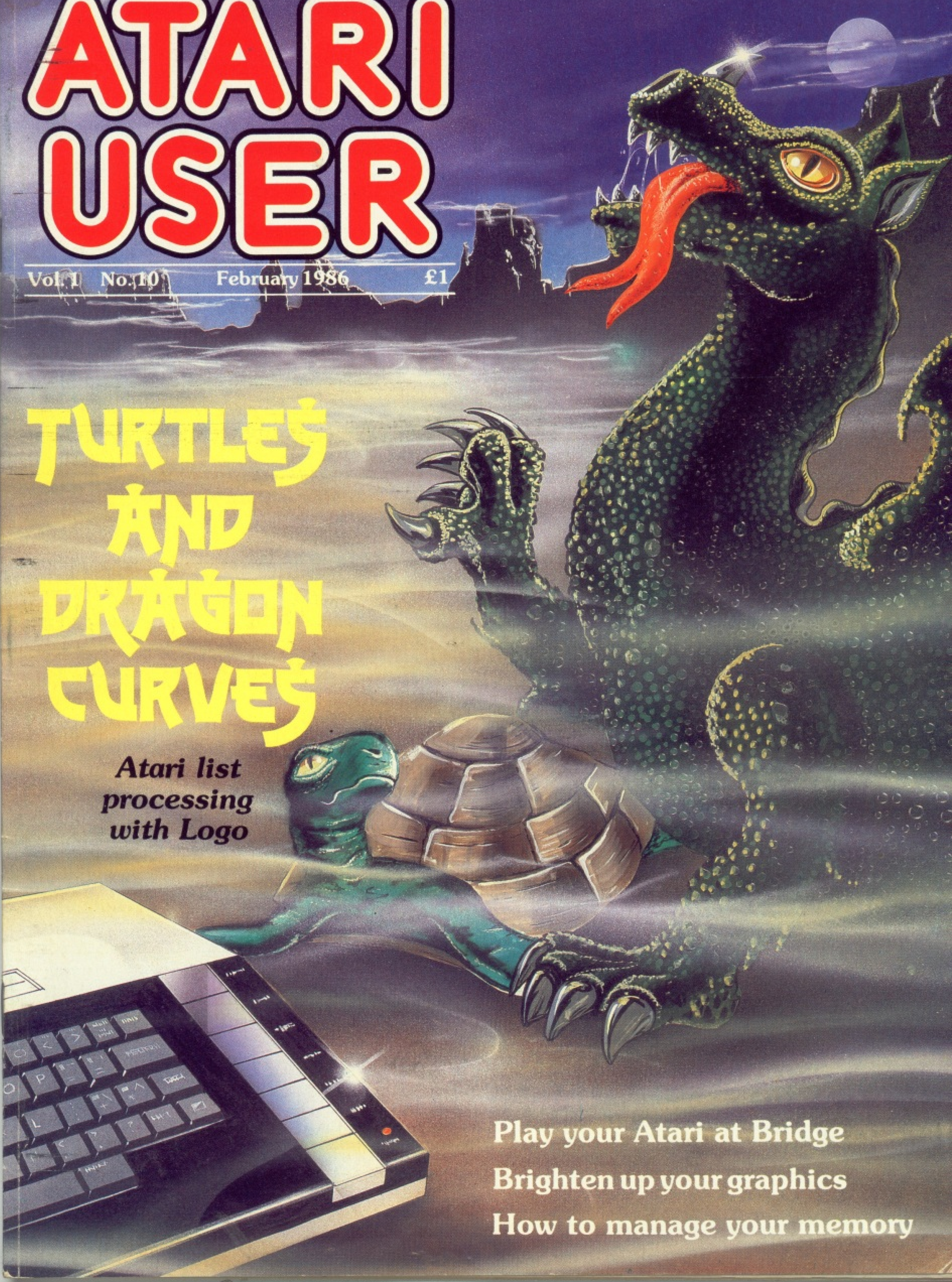
A Database Publication

ATARI USER

Vol. 1 No. 10 February 1986 £1



TURTLES AND DRAGON CURVES

Atari list processing with Logo

Play your Atari at Bridge

Brighten up your graphics

How to manage your memory

THE CHART TOPPING FLIGHT SIMULATION NOW ON ATARI

ALSO AVAILABLE ON 48K SPECTRUM, CBM64 & AMSTRAD

FIGHTER PILOT

FREE COLOUR POSTER AVAILABLE WITH DISK VERSION

BY D.K. MARSHALL
ADAPTED BY NIK SEN

ATARI

400/800/600 XL
800 XL/130 XE
WITH AT LEAST 48K.



ATARI		
Fighter Pilot Disk		☐ £12.95
Fighter Pilot		☐ £9.95
SPECTRUM		
Tomahawk	48K	☐ £9.95
Night Gunner	48K	☐ £6.95
Fighter Pilot	48K	☐ £7.95
COMMODORE 64		
Speed King Disk		☐ £12.95
Speed King Cassette		☐ £9.95
Fighter Pilot Disk		☐ £14.95
Fighter Pilot Cassette		☐ £9.95
AMSTRAD CPC 464, 664, 6128		
Fighter Pilot		☐ £8.95
Fighter Pilot Disk		☐ £13.95

Cheques payable to Digital Integration Ltd

I enclose a cheque/P.O. for ____________ Total

Name ____________

Address ____________

Please debit my Access/Visa card no.

Expiry date ____________

Tele Sales (0276) 684959

VAT and p. & p. inclusive within UK (Overseas inc. 55p. per cassette)

Please send to

DIGITAL INTEGRATION

Watchmoor Trade Centre,
Watchmoor Road,
Camberley, Surrey
GU15 3AJ

AT 2

Trade and Export enquiries welcome. Lifetime Guarantee.

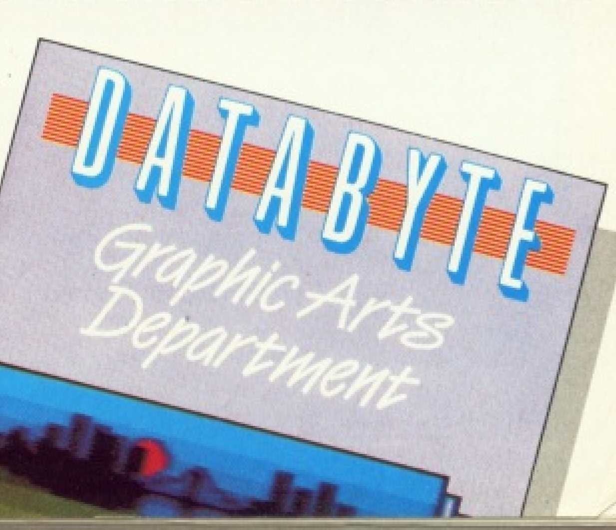


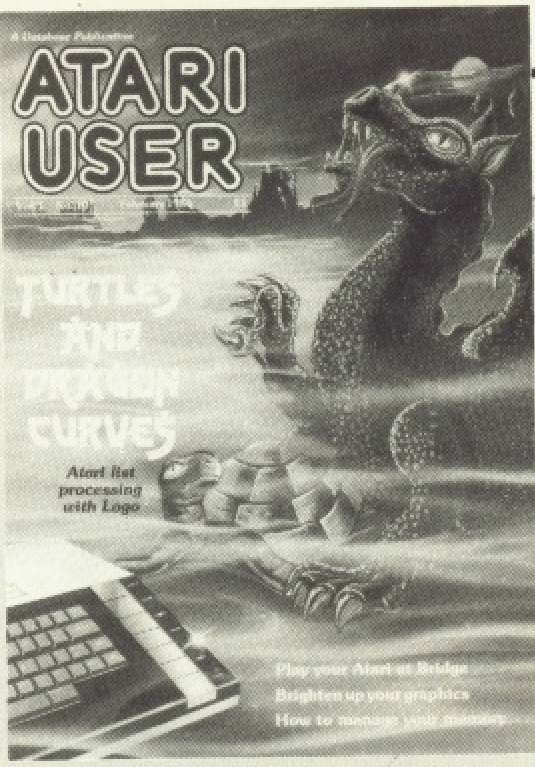
DATABYTE

Power to your palette

The Graphic Art Department is the most powerful, most versatile graphics design program available for the Atari Home Computers. It's simplicity of use make it a joy for people of all ages to paint with. It has more than 30 different commands to choose from. An incredible 128 different colours can be used in any one picture. A three stage Zoom feature allows one the ability to do very detailed and intricate work.

Other features include: the use of text in your pictures, 40 different brush patterns, a brush editor to create your own brush patterns, character editor, circle draw, brush speed control, mirror and you can even obtain a printout of your pictures. These are just a few of the many fine features to be found in the GAD. Ask your dealer for a demonstration now. **Disc: £29.95**





Vol. 1 No. 10 February 1986

Managing Editor: **Derek Meakin**
Features Editors: **Cliff McKnight**
Mike Bibby
Editorial Team: **Alan McLachlan**
Kevin Edwards
Pete Bibby
Roland Waddilove
Technical Editor: **André Willey**
Production Editor: **Peter Glover**
Design Editor: **Heather Sheldrick**
News Editor: **Mike Cowley**
Advertisement Manager: **John Riding**
Advertising Sales: **John Snowden**
Editor in Chief: **Peter Brameld**

Editorial: 061-456 8835
Administration: 061-456 8383
Advertising: 061-456 8500
Subscriptions: 061-480 0173
Telecom Gold: 79:MAG001
Telex: 265871 MONREF G
Quoting Ref. 79:MAG001
Prestel Mailbox: 614568383.

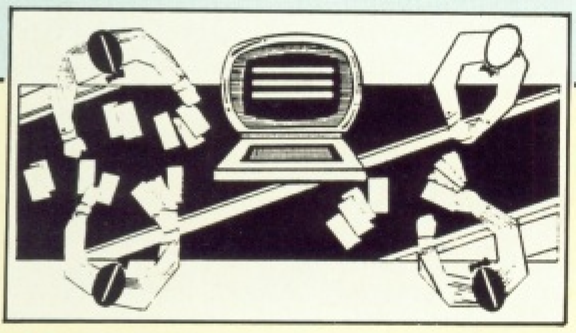
Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Subscription rates for
12 issues, post free:
£12 – UK
£15 – Europe
£30 – Overseas (Airmail)

"Atari User" welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Database Publications Ltd will be on an all-rights basis.

News trade distribution:
Europress Sales and Distribution Limited, 11 Brighton Road, Crawley, West Sussex RH10 6AF. Tel: 0293 27053.

Contents









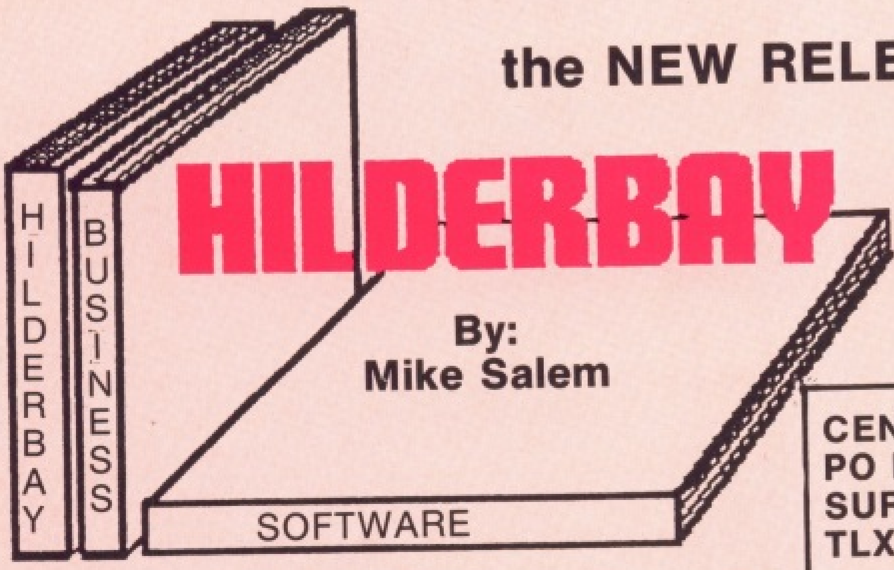
FREEBIE
This month's freebie for Atari User disc and tape purchasers is Demon's Lair. It's an adventure game to challenge even Brillig!

See Page 60

Centretime Limited proudly announce

the NEW RELEASE OF

HILDERBAY SOFTWARE



By:
Mike Salem

CENTRETIME LIMITED
PO BOX 201, KINGSTON-UPON-THAMES
SURREY KT1 1SN TEL: 01-541 1424
TLX: 265871 MONFREF G. QUOTE: 72:20030

PROFESSIONAL SOFTWARE

DEALER ENQUIRIES WELCOME

NOW AVAILABLE FOR:

Apple II, II+, IIe, IIc, Sinclair, BBC+, Amstrad, Atari, IBM PC MS-DOS & CP/M Systems.

HILDERBAY PAYROLL Ver. 5.00 — **£119.00 plus VAT**
The ideal and versatile PAYROLL for small and large business users

HILDERBAY BOOK-KEEPER — **£119.00 plus VAT**
A flexible Journal which may be used as Purchase, Sales, General or Cash Ledger

HILDERBAY INVOICER — **£119.00 plus VAT**
Makes the tedious task of typing Invoices just that little bit easier

HILDERBAY SSP STATUTORY SICK PAY — **£119.00 plus VAT**

PAYROLL UPDATE FOR EXISTING USERS: £46.00 incl VAT

ALSO: 5.25" SSDD floppy disks £7.50***

*** PER BOX OF 10 DISKS (MINIMUM ORDER 4 BOXES) ***PLUS VAT

INTRODUCTORY OFFER: RECEIVE 10% DISCOUNT BY ORDERING NOW

PLEASE ALLOW 21 DAYS FOR DELIVERY

14 Day Money Back Guarantee

ORDER FORM. To CENTRETIME LIMITED, PO Box 201, KINGSTON-UPON-THAMES KT1 1SN

Please send me: □ PAYROLL □ SSP □ INVOICER □ BOOK-KEEPER
I require DEALER INFORMATION & RATES □
MY CHEQUE/POSTAL ORDER FOR £_____ INCLUDING VAT is enclosed
I understand that I have a 14 day Money-back Guarantee and allow 21 days for the processing of my order.

NAME ....
ADDRESS ....
CITY ....
POSTCODE ....
TEL ....

800XL support is guaranteed

A SURVEY of leading suppliers has dispelled fears about future support for the 800XL now that it has ceased production.

It has conclusively revealed that ongoing back up is now guaranteed due to the machine's record sales over the Christmas period.

Almost all Atari's entire stock of 800XLs – some 100,000 machines – are reported to have been sold as a result of the cut-price offer through Dixon's High Street chain.

And this, in itself, is enough to ensure that both peripheral companies and software houses will carry on producing for the 800XL for the foreseeable future.

"It seems that a lot of people were concerned that support for the XL would soon vanish once we had stopped making it", said an Atari spokesman.

"But this could not be further from the truth now. For the huge user base that's out there as a result of recent sales will make sure the machine is alive and well for a long time to come.

Viable

"The fact of the matter is that it remains a viable commercial proposition to service the 800XL market".

According to Tony Deane of Silica Shop, the leading Atari distributor, there are currently 2,000 titles available for the 800XL and the figure is still growing.

Nor does he believe there is any cause for concern by anyone who has bought an Atari 8-bit machine – whether it is a 800XL or a 130XE.

"The reason for this is that Atari has always had a policy of bringing out new machines totally compatible with its existing range", he told *Atari User*. "This is a completely different approach than other manufacturers.

"The company historically has always proved willing to stand by the consumer by producing new machines that work with old software – and vice versa.

"Possibly the only way a problem could be created is if there was a lot of new software come out to fit the 130XE's higher memory capacity. Obviously this would not run on the 800XL.

"But not much software makes use of this. After all, most software houses are clever and stick to 64k capacity so they can sell to users of both machines.

"In fact of all the 8 bit software out at the moment there can't be more than six titles available for the 130XE exclusively".

The stops are out!

AN investigation by *Atari User* has revealed that more than 100 new products are likely to be launched at the first Atari Computer Show.

But such is the sensitivity of the marketplace that not one firm contacted was willing to provide details of their top secret projects at this stage.

"You'll just have to wait until the opening day", said a spokesman for one leading peripheral manufacturer. "This is a very competitive business".

However *Atari User* has been able to learn that up to two thirds of the innovations are aimed at the eight bit market, with one third ST bound.

To be held at the Novotel, Hammersmith, from March 7 to 9, the organisers – Database Publications – are already predicting the show will be a bonanza.

"With Atari having been around for quite some time – and this being the first user show – it's going to be a very special event", says Derek Meakin, head of Database.

Excited

"The Atari corporation itself is especially excited about it as there has never been an official show before, not even in the United States.

"It is shaping up to be a real international showcase and that's why companies are pulling out all the stops to get products ready in time".

One company has even chosen the show to launch itself. SECS, a subsidary of Software Express, will take its bow on the opening day.

"We couldn't think of a better way to get ourselves known", said a SECS spokesman.

And it seems that the show has already gripped the imagination of Atari users all over the UK.

Up in Birmingham, the Atari user group has already announced it has booked two coaches to take its members to the show.

ST software growing

THE new year began with an amazing total of nearly 150 software items available from UK suppliers for the 520ST.

Rob Harding, Atari sales and marketing manager, says: "The support from software developers is staggering.

"We now have more than 200 ST development systems in use in the UK – along with a similar number in the USA.

"As a result of all this effort new software titles are appearing on a daily basis".

Atari seems to have succeeded in what Harding describes as "our determination that the ST will have software covering all areas of the market from games and entertainment through to serious business and vertical applications".

The latest list shows more than 140 titles of which only 51 are classified as "entertainment".

The others include 14 accounting packages, 10 word processors, three spreadsheets, nine databases, five communications packages, six graphics packages, 18 programming languages and 11 utilities.



Right on cue

DONCASTER based software house CDS is right on cue with its introduction of Steve Davis Snooker for the XL range.

It offers a large variety of skills to suit all players with three table speeds, accurate control of the degree of spin and play options – all by either keyboard or joystick.

Edit mode displays a hand which can pick up, move or drop balls anywhere on the table. This enables the setting up of trick shots or problems for later solution.

If a shot is "fluffed", pressing the cheat key allows the move to be erased and the table to be reset to its previous position.

"Even Steve can't do that", says a CDS spokesman.

Steve Davis Snooker is £9.95 on cassette and £12.95 on disc.

Pirate threat rebounds

THE man who is offering a reward for tracking down Atari software pirates has himself been accused of selling equipment that can be used for illegal copying.

John Lawson, boss of utility specialist Computer Support, told *Atari User* last month that he will give £100 for information leading to the successful prosecution of those guilty of pirating his products.

This followed his discovery that his firm's machine code monitor Ultimon and 80 column text mode 80 Column Pack had been copied and were available on the black market.

But Lawson's stand has angered several Atari users who feel he wants to "have his cake and eat it too".

One of them, Andrew Fisher, secretary of the Plymouth Atari User Group, said: "I personally find it very hypocritical of Mr Lawson to complain about the way in which his utilities are sold on the black market.

"Computer Support themselves sell items which, despite the disclaimer at the bottom of their adverts, enable people to pirate other companies' software. The offending products are the disc, cassette and cartridge backup programs and most notably the disc drive modification Bad Sector which is exceedingly useful to anyone wishing to copy commercially available programs protected by – yes, you've guessed it – bad sectors.

"Even the ROM-based Ultimon could be used to pirate software if it is anything like its American lookalike Omnimon".

Another reader, who asked *Atari User* to protect his identity, wrote: "This is a blatant case of the pot calling the kettle black.

"Mr Lawson's range of utilities comprises mainly piracy aids such as Ultimon which allows users to break into programs and write them to a file which is easily copied.

"Also ROM Emulator which allows cartridge software to be copied, Bad Sector which enables copying of protected disc software, Super Disassembler to allow alteration of tapes to discs and vice versa, two disc copiers and various other 'utilities'.

"I would say that at least 50 per cent of his products are aimed at the pirates market, which is strange coming from a man who is so much against piracy".

The criticisms were described as absurd by John Lawson.

He told *Atari User:* "Any utility can be part of the toolkit of a pirate. It's people who carry out illegal copying – not equipment.

"No supplier of utilities can control the uses they are put to after purchase. We can only put our trust in the honesty and goodwill of our customers.

"My programs are sold on the understanding they are used solely for personal backup and not for illegal purposes.

"Thankfully the vast majority of Atari users are not cheats and are 100 per cent behind me in the stand I am taking against the pirates.

"The people most likely to be upset about my actions are those engaged in copying themselves".



Reward offered to trap pirates

ANGERED by the extent to which pirates are infiltrating the Atari scene, the boss of utility specialist Computer Support is ... are available to the general ... public for £... the pira...

From last month's Atari User

Atari UK denies ST price – slashing report

A REPORT from America that Atari is about to dramatically slash the price of the 520ST has been officially dismissed as "speculative rubbish".

The story which subsequently appeared on Micronet, the UK electronic mail service, claimed that the price of the machine was to be dropped to $399.

It alleged that this was to be timed to coincide with the launch of a 1 megabyte version of the ST – known as the 1040ST – to be marketed "with colour monitor for $999".

When informed of this, Atari UK's sales boss Rob Harding described the story of the proposed price cut as not only inaccurate but harmful.

"There are simply no plans to reduce the price of the 520ST package", he told *Atari User*.

"What is actually happening in the States – and probably how the confusion started – is that for that market only there will be a special package made up of just the ST keyboard.

"It will be sold at a reduced price, but there will be no disc drive and no monitor, although it may come with a modulator. And it will not be sold in the UK.

"We remain convinced that the present 520ST bundle is the right configuration at the right price".

As far as a possible launch of a 1 megabyte version of the ST was concerned, Rob Harding was less dogmatic.

"We have no immediate plans to sell any machines with 1 megabyte of memory, whether they be STs or not", he commented.

Meanwhile, despite yet a further report from the United States that the proposed 260ST was to be dropped, Rob Harding insists it is still on its way.

"We are still on target for spring", he says.

Micro help for the handicapped

THREE special day courses dealing with the use of computer technology by disabled people have been arranged during March and April.

Dorset Spastics Society is sponsoring Technology and Young People with Special Needs in Poole on March 7. Enquiries to Mrs K. Vandervelde, Langside School, Langside Avenue, Parkstone, Poole, Dorset BH12 5BN.

On March 21, New Developments in Technology and Disability will be the subject of a course in London. Enquiries to Miss Hilary Came, Richard Cloudesley School, Golden Lane, London EC1Y 0TJ.

Barrow and District Council for the Disabled is sponsoring New Developments in Disabled Living on April 2 at Barrow in Furness. Enquiries to Mrs B. Holgate, Health Education Department, The Rookery, Brogden Street, Ulverston, Cumbria.

Failure

ATARI has pulled out of a deal to bundle Digital Research's GEMWrite and GEMPaint with the 520ST because the software giant failed to deliver on time.

The company has now come up with replacements in the form of 1st Word, a word processing package from Cambridge based GST, and DB Master One, a business database from USA's Stonemaster.

"We made this decision based on Digital Research's failure to supply us with a suitable product by the agreed date", Rob Harding, Atari UK's sales manager, told *Atari User*. "So we had to make other arrangements".

However Rob Harding insists that the new software will in no way detract from the ST bundle offer.

"1st Word is a superb GEM

Five get converted



BUDGET software house Blue Ribbon has converted five of its established range for the 48k Atari – Castle Assault, Diamond Mine 1, Nightmare Maze, Screwball and Darts.

All cost £2.50 each on cassette or £9.95 for the five on disc.

The first two games have similar goals. In Castle Assault the task is to collect gold while avoiding a "menacing menagerie of meanies". In Diamond Mine it is to gather precious stones from tunnels and shafts while avoiding a hoard of obstructive bugs.

Cups of coffee have to be found, escape keys collected and monsters avoided in Nightmare Maze, through which the player must guide Sleepy Joe.

In Screwball the player is given 60 seconds to change the colour of all the squares in the grid. This time the assailants are the Black Bugs.

Last of the five games is Darts. This includes three programs – 501, Round the Board and Cricket.

'This will be the year of Atari'

ATARI'S 8 bit user base in the UK has now reached 400,000 thanks to High Street giant Dixons selling "almost all" the remaining stock of the now defunct 800XL.

In all, close to 100,000 of the machines are believed to have been sold during the run up to Christmas alone.

And Atari distributors and dealers couldn't be more pleased with the prospects for 1986.

"This will be the year of Atari", says Tony Deane of Silica Shop. "For the sale of all those XLs has helped create an enormous marketplace for software and peripherals.

Competitive

"And the 130XE is also going incredibly well, even to the extent where we actually ran out of stock at one time recently. So everyone is doing very nicely – including the customers.

"After all, the larger the market out there, the more keen the companies are to get into it, so prices become even more competitive".

to deliver makes Atari drop GEM

based word processor with full windowing and drop down menu facilities", says the company sales boss.

"And we are including a database with the 520ST rather than GEMPaint because after consulting a number of people it is very clear that the ST is being sold in a professional and business environment where a database will be more useful".

Atari has also revealed that it is to include two further free pieces of software in the ST bundle – Megaroids, a version of the Asteroids arcade game, and Doodle, a graphic painting package.

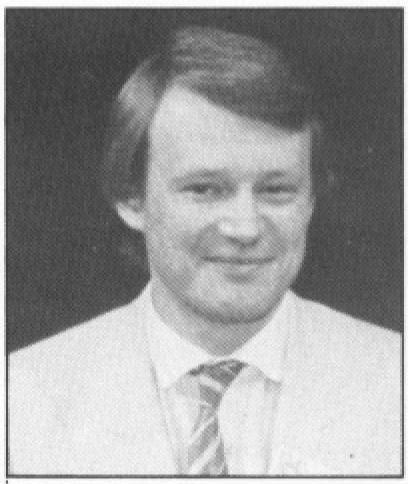
"We believe that these will make the 520ST an even stronger overall total package", he said.

All current ST owners are now being requested to contact their dealers who will supply them with the new software free of charge.

Meanwhile just what happens to the Atari versions of GEMWrite and GEMPaint when they do become available is the centre of some controversy.

According to Digital Research's vice-president Paul Bailey, there is every likelihood they will still subsequently be bundled with the 520ST.

"Now we appreciate the fact we were a month late in



Rob Harding: "Even stronger package now".

delivering for appraisal", he told *Atari User*. "But there is nothing that says they won't be eventually bundled with the ST".

However Atari doesn't seem to agree.

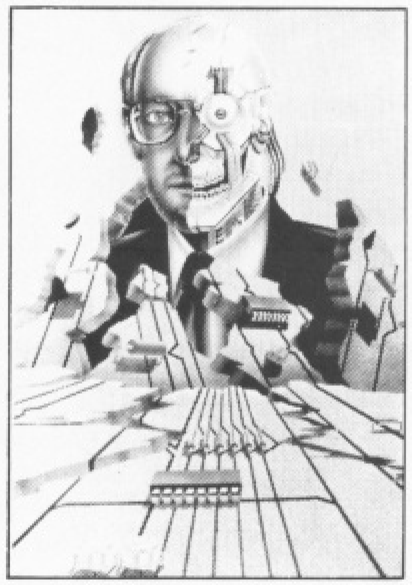
"As far as we are concerned, the deal is now dead", a spokesman said.

When informed of this, Paul Bailey commented: "If that is the case, we'll market it ourselves to Atari users".

Software to fight heroin

A TRIO of software houses involved in the Atari market have joined forces in the fight against heroin addiction.

Gremlin Graphics, Activision and US Gold have



all donated programs to "Off the Hook", a games compilation tape, the proceeds from which will be used in the war on drugs.

Launched by the home computer games industry at its annual dinner, it is hoped to raise more than £100,000 through the sale of the tapes campaign.

Artist David Rowe's picture (above) is being used to link up with the anti heroin campaign. This will involve the sale of a limited edition of some 70 colour prints.

Fleet Street gets bigger

MIRRORSOFT is working on an implementation of its Fleet Street Editor program which it claims will turn the 520ST into a fully operational photocomposition workstation.

Due for an early summer release, the ST version is still under development.

So far the company is keeping mum about the program's proposed features and price – except to say it is aimed at both professional and hobbyist markets.

Don't miss the BIG Atari event of 1986!

ATARI COMPUTER SHOW



For the first time Atari UK and all the major suppliers of Atari hardware and software are pulling out all the stops to make the first-ever Atari Computer Show the top event of the year.

Everyone who's anyone in the Atari world will be there. Already many third-party suppliers are planning to use the show as a launching pad for products still on the drawing board.

If you're a long-standing Atari user the show will bring you right up to date on all the exciting developments now taking place in the ever-expanding Atari world.

And if you're one of the many thousands of newcomers to Atari computing it will open your eyes to the vast selection of Atari hardware and software that is now available for the whole Atari range.

It's a show you cannot afford to miss!

Champagne Suite, Novotel, Hammersmith, London W6

Friday	Saturday	Sunday
7 March	8 March	9 March
10am-6pm	10am-6pm	10am-4pm

'The Atari Computer Show will be a shop window for Britain and something that not even our American cousins have achieved'. – **Mike Reynolds, Sales Director, Software Express.**

'It will provide us with an opportunity to show the Atari consumer just how much good software there is in the marketplace'. – **Tony Deane, Marketing Director, Silica Shop.**

'There will be an exciting range of new products on display at the show'. – **Rob Harding, Sales Manager, Atari UK.**

Save £1 a head – and miss the queues! – by sending for your tickets now!

Please supply:

- [ ] Adult tickets at £2 (save £1) .... £ ________
- [ ] Under 16s tickets at £1 (save £1) ...... £ ________

Total £ ________

- [ ] Cheque enclosed made payable to Database Publications Ltd.
- [ ] Please debit my credit card account

Access ____ ____ ____ ____

Visa ____ ____ ____ ____

Admission at door: £3 (adults). £2 (under 16s)

ATARI COMPUTER SHOW

Advance ticket order

Post to: ***Atari Show Tickets, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

Name ....

Address ....

....

.... Signed ....

PHONE ORDERS: RING SHOW HOTLINE: 061-480 0171

Please quote credit card number and full address.

AT 2

The Turtle



A PRECURSOR of Logo was the language Lisp, which was used for LISt Processing and had a very unusual property – the statements that were used to run a program were themselves a list.

Thus Lisp could manipulate itself in ways that are only dreamed of in other languages. It is for this reason that Lisp is still around today, since it is an ideal language for use in artificial intelligence work. List processing is still part of Logo, and a very important part of it.

Let me digress and explain some of the Lisp-derived commands that are still found in Logo. First of all, variables are very difficult to handle in Logo. However lists are a necessary part of the language.

Commands like SET Position expect a list of two numbers so that the turtle will know where to move. There are strange commands like BUTLAST and BUTFIRST that will take a list and give back another list that is the same except that the first item in the list is gone (BUTFIRST).

Lists can be made up of other lists. Lists can be put together and taken apart. There is even a special command called NUMBER that tells how many members are in a list.

One further digression, I have been taking about lists and have not shown any examples of one. In Logo, lists are enclosed in brackets []. It could be a list of names, such as: [Rebecca Lauren Gabriel Daniel]. Or a list of numbers like [3 6 2 8]. Or a mixed list with the first element in the list itself, being a list, as in: [[1 3 7 2] Rebecca Gabriel Jason].

Let us call this list ABC. ABC has four members in it. If we asked LOGO to NUMBER ABC and PRINT the answer it would give us 4. If we asked LOGO to BUTFIRST ABC then LOGO would give us [Rebecca Gabriel Jason]. If we asked for FIRST ABC then it would give us [1 3 7 2]. Several other commands that can be used for manipulating lists include SE, WORD and CHAR.

You are probably asking yourself how does this relate to anything that is fun or useful. When a command is written in Logo it is written as a list. The command can be manipulated and changed and then run. Logo does not care if it is a list or a command.

What we are going to do is write a program to make the turtle draw what is known as a Dragon curve. This is a mathematical formula that is very recursive, and in effect bites its own tail. Every dragon curve will become more complicated until it will fill the screen, but every new dragon curve is related to the old one through a simple procedure.

SOL GUBER looks at list processing on the Atari using Logo

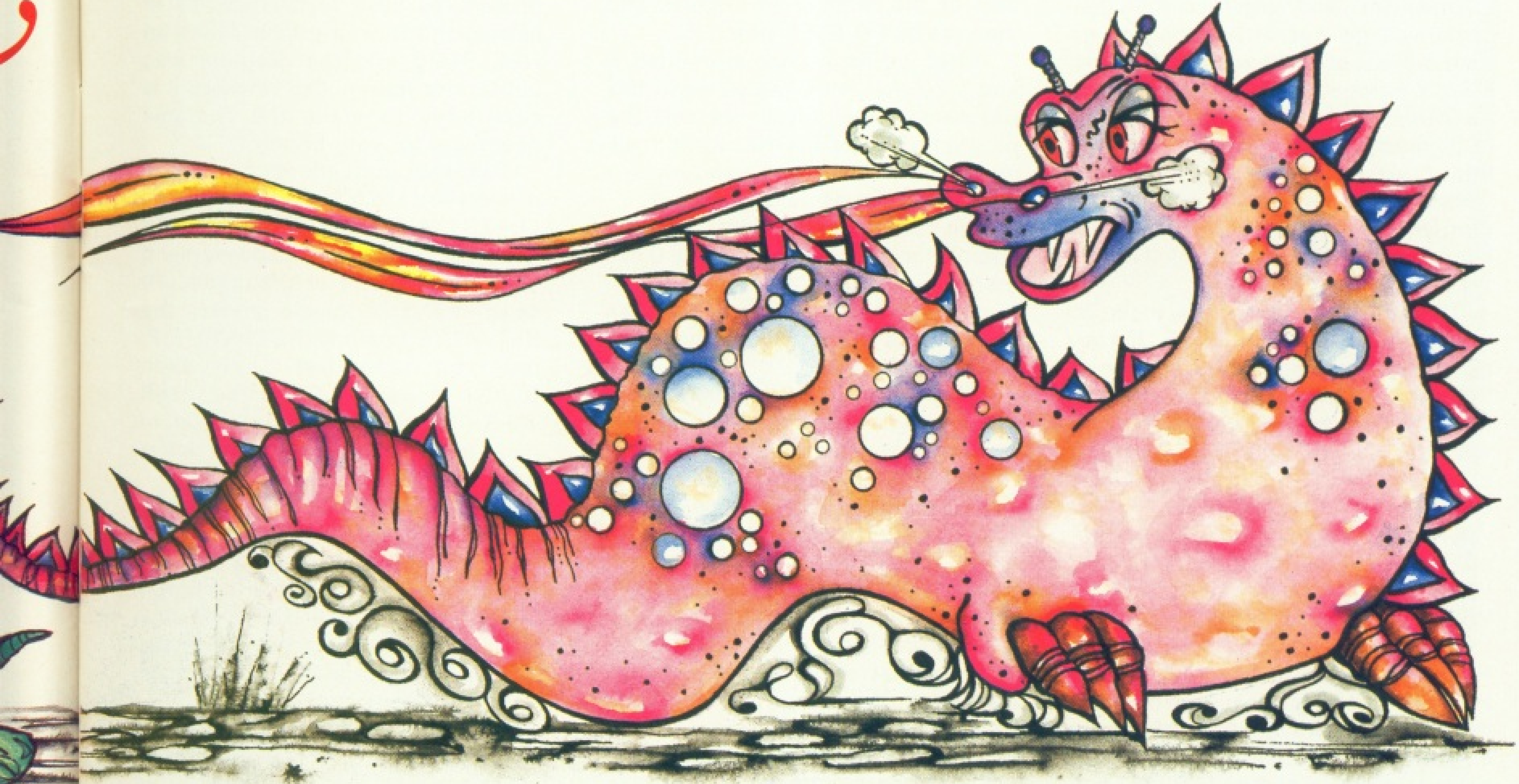
The dragon curve is a method of making a line that fills up a space. The classical dragon curve will not touch itself at more than two points and will never cross itself. The program is made up so that the classical dragon curve is drawn or you can start the dragon curve with your own formula.

To make the turtle draw a dragon curve is very easy. The classical dragon curve, of order 1, is L. This means that the turtle walks forward so far and then makes a Left turn and walks the same distance again. Order 2 takes the Order 1 curve, adds an L to it and then goes backwards through the old one, reversing every L to a R and every R to an L. Thus the Order 2 curve is L-L-R. This means that the turtle walks forward, makes a left turn, walks forward, makes a left turn, walks forward, makes a right turn and then walks forward again.

The Order 3 curve is make from the Order 2 curve. It is LLR-L-L-LRR, again reversing the Ls and Rs in a backward direction. Order 4 is LLRLLRR-L-LLRRLRR, and so forth. It is very easy to teach the turtle to walk this path and as the paths become more complicated, the path begins to look like a Chinese dragon.

Back to list processing. Let us assume that there is a list with the instructions for a turtle on how to walk to make a dragon curve. If it is a list, then it can be manipulated and a new list made that is the next order of complexity. Then the next order of complexity can be made.

Let us see how this is done. There are procedures that are used to



...and the Dragon

manipulate this list of the directions.

First let me explain several of the less common Logo commands – SE (SEntence), RUN and COUNT. I will also explain more about the recursiveness of Logo.

SE is an easy one. It takes the elements in its inputs and makes a list out of them. For example SE [1 2 3] [REBECCA LAUREN GABRIEL] would give an output of [1 2 3 REBECCA LAUREN GABRIEL] This is very useful for making lists up. It is different than if we LIST them together because then we would get [[1 2 3][Rebecca Lauren Gabriel]].

The difference is more evident if we use the NUMBER command to determine the number of elements in the list. If we NUMBER the first list made by using SE the result would be 6. If we NUMBER the second list made by using LIST the result is 2.

The next strange command is RUN, which takes the next list and tries to make it perform an action. If all the commands in the list are defined the proper action will be done. This is the heart of any Lisp program, the making of a proper list and then RUNning it.

Another useful command is BUTFIRST and FIRST. Let us use the list [1 2 3 4]. The FIRST member is [1]. and BUTFIRST is [2 3 4]. There is a corresponding set of commands called LAST and BUTLAST which take the list and everything but the last member in a list.

Finally there is the command WORD which makes up a word out of its inputs, and CHAR which puts out a character from a number value.

Two other commands are used in the program, RC (Receive Character) outputs the next character read from the keyboard, and RL (Receive Line) gets a whole line that is typed and ended with RETURN.

Let me go through the program. The main command is DRAGON. It MAKES STEP 50 and then does procedure START, which asks if you want to make your own dragon.

The next statement is an IF test to determine if the character typed is an N. If it is, then DRAG is made equal to [L] and a classical dragon is drawn. If the character is not N then a line is printed to tell you to type Rs and Ls to make your own formula for a dragon.

DRAG is made equal to the value from RL (Receive Line). Then there are two checks to decrease the size of

→

STEP so that the dragon will fit on the screen. The program then returns back to DRAGON. Window is called to make the field larger, so that the turtle will go out of bounds rather than make a poor dragon curve. Then DRAW is repeated 10 times.

DRAW is the main procedure. It calls most of the other procedures and makes the turtles draw the Dragon curve correctly. The first thing that DRAW does is check to see if a key has been pressed (KEYP). If it has then the program stops.

The next thing it does is make a new variable equal to DRAG. If you remember the conventions of Logo a " before a variable signifies the name and a ":" before a variable signifies its value. So MAKE "WORK :DRAG means make the variable WORK equal to the value of DRAG.

The next step is to put an L on the end of WORK. This is done by making WORK equal to the SEntence of WORK and CHAR 76 (L).

Next the recursive procedure REDO is called. This means that somewhere in REDO, REDO uses itself. The only way that this can work and not turn into an endless loop is if there is a check somewhere to stop the loop. The first statement does just this. IF 0=COUNT :DRAG then stop. If there are no more values in DRAG then stop.

The next statement makes the modifications for the next order of the dragon curve. IF R is the last member of DRAG then MAKE WORK the value of work and CHAR 76 (L) otherwise make WORK equal to WORK and CHAR 82 (R). The next line makes DRAG equal to BUTLAST DRAG and the REDO does it again. Each time DRAG goes through REDO it becomes shorter and finally it will fall out of REDO and return.

Back in DRAW, DRAG is made equal to WORK. The screen is cleared (CS), and TELL turtle 0 to go to work. The next statement is the heart of the program. It is RUN :WORK. It says to take the list found in WORK and RUN it.

As we have seen previously, WORK is make up of a series of Rs and Ls. And now we are telling the program to RUN this?

There are still some procedures that we have not gone through yet and two of these are R and L. There is a procedure called R that calls WALK and gives it two values 90 and STEP. The procedure L calls WALK with the values −90 and STEP. WALK takes these two values and makes a RIGHT turn of the number of degrees and then walks FD STEP times.

What we have done is defined R and L so that it makes sense in this program. Then when we tell the program to RUN :WORK, what it will do is take the Rs and Ls and make a pattern on the screen.

The rest of the program is rather straightforward. Once the turtle 0 has made the pattern, SET_UP tells all four turtles to simultaneously make the same pattern using another RUN :WORK command.

All the turtles are oriented at 90 degree angles so that there will be four dragons tail-to-tail on the screen. After this is done REDUCE makes STEP smaller if it is not less than 4. Then the program falls back to DRAGON.

One more set of routines is used in this program, and it was not added at any specific spot. One of the lacks of Logo is that there is not a screen dump routine written specifically for it that will work with any sort of printer. I have written a set of procedures that will put a screen dump on a printer, but it needs to be modified to run on each individual printer.

First let's see how the screen is set up in memory. The area called screen memory contains information on what will be put on the screen. Each byte of memory contains 8 bits, and the system uses these two at a time to make the dots on the screen.

The turtle draws in what is known as Graphics 7 mode, and each byte of memory corresponds to four dots, or pixels, on the screen. The bits taken two at a time say which colour is to be used for the dot, and since two bits can only have the values of 00 01 10 11 (0, 1, 2, 3), this corresponds to which pen is used to make the dot.

What the screen dump does is take the eight bits and divide them into two parts. It then looks at each four bit part which contains the information about two pixels and decides which pattern it is. Since most printers cannot make colours, all this routine does is determine if the pixel is lit or not. The four possibilities for two pixels are both dark, left dark–right lit, left lit–right dark, and both lit. Since there are 160 pixels across the screen, the two pixel pattern will correspond exactly to the 80 columns across the page, and a screen dump can now be done.

Since every printer is different, four procedures have to be modified to correspond to your printer. I have an NEC 8023 and the program was written for that model. However it is very easy to make the changes necessary for your printer.

The four procedures that need modification are BLANK, LEFTBLANK, RIGHTBLANK and SQUARE. These procedures send certain characters to the printer. To send material to the printer the SETWRITE command SETWRITE P: must be done first. Then when BLANK is used it TYPEs the CHAR whose value is 32 into the printer. In most printers, this is the value that is the blank character.

LEFTBLANK uses the CHAR 139 to put a half column of darkness on the printer. On printers like the 825 the value 24 is used. The Epson uses a 234 for this. SQUARE uses the value 135 to put a black square on the printer. The 825 uses a 162 and the Epson a 239.

On the 825 a 150 value will give a RIGHTBLANK. The Epson uses a 233. However the RIGHTBLANK for the NEC uses a more complicated routine to put a blank right on the printer.

The NEC does not have a special character for a half column with the right part partially filled and I had to make up my own. The NEC has something called pin addressing which can make up for this. Every pin in my dot matrix printer can be told whether to be in or out.

What I want for RIGHTBLANK is a character made up of four vertical columns of nothing and then four columns of full blackness. To do this I need to send to the printer the coding that sets of the proper coding for pin addressing (27 83) and then tell it that there will be eight numbers coming to be used (48 48 48 56) and then finally the coding for the actual printing (0 0 0 0 255 255 255 255). I have thus generated my own character which has the printing that I want.

One other need is to have the lines closer together to make the picture appear more realistic. There is a procedure called SPACING that changes the spacing to 8/72 of an inch. This will have to be modified to your own printer also. The Epson uses

```
TO SQUARE
TYPE CHAR 135
END

TO LEFTBLANK
TYPE CHAR 139
END

TO BLANK
TYPE CHAR 32
END

TO WRITE :A
IF 0 = :A [BLANK STOP]
IF 4 > :A [RIGHTBLANK STOP]
IF 0 = REMAINDER :A 4 [LEFTBLANK STOP]
SQUARE
END

TO PIXEL
MAKE "SPOT .EXAMINE :SCREEN
IF 0 = :SPOT [BLANK BLANK STOP]
WRITE INT :SPOT / 16
WRITE REMAINDER :SPOT 16
END

TO LINE
REPEAT 40 [PIXEL MAKE "SCREEN :SCREEN + 1]
END

TO RIGHTBLANK
TYPE CHAR 27 TYPE CHAR 83
TYPE CHAR 48 TYPE CHAR 48
TYPE CHAR 48 TYPE CHAR 56
TYPE CHAR 0 TYPE CHAR 0
TYPE CHAR 0 TYPE CHAR 0
TYPE CHAR 255 TYPE CHAR 255
TYPE CHAR 255 TYPE CHAR 255
END

TO SPACING
TYPE CHAR 27 TYPE CHAR 84
TYPE CHAR 49 TYPE CHAR 54
END

TO PRINTER
MAKE "SCREEN 256 * .EXAMINE 14273 + .EXAMINE 14272
SETWRITE "P: SPACING
REPEAT 96 [LINE]
SETWRITE []
END

TO L
WALK -90 :STEP
END

TO DRAGON
MAKE "STEP 50
START FS
REPEAT 10 [DRAW]
END

TO START
PRINT [DO YOU WNAT YOUR OWN DRAGON Y / N]
IF EQUALP RC "N [MAKE "DRAG [L] STOP]
PRINT [YOU WILL NEED TO TYPE R'S AND L'S]
PRINT [WITH A SPACE BETWEEN EACH ONE] MAKE "DRAG RL
IF 5 < COUNT :DRAG [MAKE "STEP :STEP / 1.2]
IF 8 < COUNT :DRAG [MAKE "STEP :STEP / 1.2]
END

TO DRAW
IF KEYP [STOP]
MAKE "WORK :DRAG
MAKE "WORK SE :WORK CHAR 76
REDO
MAKE "DRAG :WORK
TELL 0
CS
RUN :WORK
WAIT 45
SET_UP RUN :WORK
REDUCE
END

TO REDUCE
IF 4 > :STEP [STOP]
MAKE "STEP INT :STEP / 1.3
END

TO REDO
IF 0 = COUNT :DRAG [STOP]
IF EQUALP "R LAST :DRAG [MAKE "WORK SE :WORK CHAR 76] [MAKE
"WORK SE :WORK CHAR 82]
MAKE "DRAG BUTLAST :DRAG
REDO
END

TO SET_UP
TELL [0 1 2 3] PU HOME CS
TELL 1 SETH 0 SETPC 0 39
SETPN 0
TELL 0 SETH -90 SETPC 1 15
SETPN 1
TELL 2 SETH 90 SETPN 1
TELL 3 SETH 180 SETPC 2 87
SETPN 2
TELL [0 1 2 3]
PD
END

TO WALK :A :B
RIGHT :A
FD :B
END

TO R
WALK 90 :STEP
END

MAKE "WORD [A]
MAKE "RB []
MAKE "RBLK [27 83 0 0 0 8 0 0 0 0 255 255 255 255]
MAKE "L1 [R]
MAKE "P1 [R]
MAKE "SPOT 0
MAKE "START 84
MAKE "STEP 5
MAKE "SCREEN 18960
```

Dragon curve procedures

a [27 65] coding.

Thus PRINTER is called to do a screen dump. It determines the first spot in memory that is the screen memory by checking the pointer at 14273, and sets this value to SCREEN. It starts the printer and changes the SPACING. It then calls LINE 96 times to print out all 96 lines of the screen, and finally turns off the printer. LINE calls PIXEL 40 times and after each call, increments SCREEN.

PIXEL finds the value at the location SCREEN and separates it into two parts which it sends to WRITE if it is not zero. If it is zero two BLANKS are sent and the procedure returns to LINE. WRITE determines if it is a BLANK, A RIGHTBLANK, a LEFTBLANK, or a SQUARE coding is to be sent to the printer. It then returns to PIXEL.

PRINTER is *extremely* slow. It will take almost five minutes to print out the full screen. I will control myself and make no bad puns about turtles.

There are facilities to make the screen dump in machine language, but that is not the purpose of this program. If I were to add it, the step would be in DRAW as follows : IF :STEP < 5 THEN PRINTER.

This program is an example of a program writing its own program – the major characteristic of Lisp. It does not care if the list contains names or numbers or instructions, it is treated just the same and stored just the same. Thus an instruction list can be modified when needed and when checked by external observations, which make this the language of choice for artificial intelligence work.



THE 520ST. OVER QUAL

AVON BRISTOL
Computer Exchange.
AVON BRISTOL
Laskys.
AVON BRISTOL
Radford Hi Fi.
BEDS BEDFORD
Bedford Computers.
BEDS LUTON
Hobbyte Ltd.
BEDS LUTON
Laskys.
BELFAST
CEM Micro-Computer Services Ltd.
BELFAST
Computer All Ltd.
BELFAST
Education Company Ltd.
BELFAST
Ideal Radio.
BELFAST
N.P.O.
BERKS READING
HMV Micro Shop.
BERKS. READING
Laskys.
BERKS SLOUGH
Laskys.
BERKS SLOUGH
Silicon Chip.
CAMBS CAMBRIDGE
Cambridge Computer Store.
CAMBS CAMBRIDGE
Laskys.
CAMBS PETERBOROUGH
Laskys.
CENTRAL FALKIRK
Microplus.

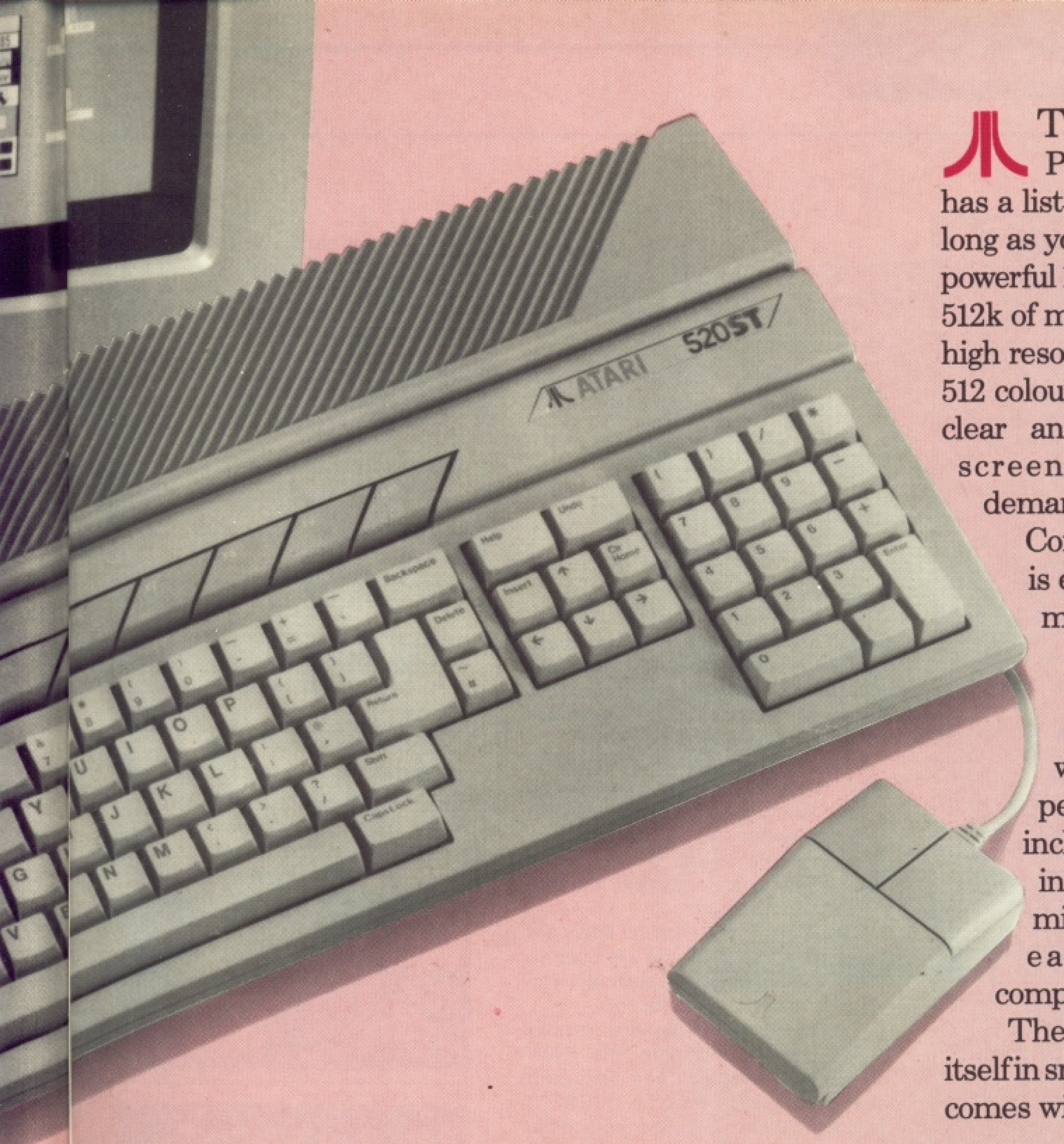
CHESHIRE CHESTER
Laskys.
CHESHIRE CREWE
Woottons TV.
CHESHIRE WARRINGTON
Warrington All Computers.
CHESHIRE WILMSLOW
Fairhurst Instruments Ltd.
CLWYD WREXHAM
Micro Computer World.
CLWYD WREXHAM
Micro Computer Centre.
CO.DERRY
Donaghy Brothers.
CO. DOWN WARREN POINT
Visions Video.
CO. DURHAM
DARLINGTON
Darlington Computer Shop.
DERBYSHIRE
CHESTERFIELD
F.A.W. Electronics.
DEVON EXETER
Laskys.
DEVON PLYMOUTH
Laskys.
DEVON PLYMOUTH
Syntax Ltd.
DORSET BOURNEMOUTH
Lansdowne Computer Centres.
DORSET POOLE
Lansdowne Computer Centres.
ESSEX COLCHESTER
Colchester Computer Centre.
ESSEX COLCHESTER
Capricorn Computers.
ESSEX COLCHESTER
Laskys.

ESSEX HARLOW
Achter Instruments Ltd.
ESSEX HARLOW
Laskys.
ESSEX ROMFORD
Laskys.
ESSEX SOUTHEND
Laskys.
ESSEX SOUTHEND
Estuary Computers.
ESSEX WESTCLIFF-ON-SEA
Sterling Resources.
FIFE GLENROTHES
Computer Services (Scotland) Ltd.
GLOUS CHELTENHAM
Laskys.
GLOUS GLOUCESTER
Laskys.
GRAMPIAN ABERDEEN
Laskys.
GRAMPIAN ABERDEEN
Microshack.
GT. MANCHESTER BOLTON
Computer Annex.
GT. MANCHESTER
FAILWOODFIELD
Mighty Micros.
GT. MANCHESTER
MANCHESTER M4
Laskys.
GT. MANCHESTER
MANCHESTER M1
Laskys.
GT. MANCHESTER
MANCHESTER
Lewis's Ltd (Sound & Vision).
GT. MANCHESTER
MANCHESTER
NSC Computershops.

GT. MANCHESTER STOCKPORT
New Mills Micro Centre.
MERSEYSIDE LIVERPOOL
Lewis's Ltd (Sound & Vision).
GWENT EBBW VALE
Computability.
HANTS PORTSMOUTH
Microchoice.
HANTS SOUTHAMPTON
AMS Systems Limited.
HANTS SOUTHAMPTON
Laskys.
HERTS ST ALBANS
Hobbyte Ltd.
HERTS WATFORD
Laskys.
HIGHLAND INVERNESS
Nova Computers.
HUMBERSIDE HULL
Golding Computer Services.
HUMBERSIDE HULL
Tommorrows World.
KENT BECKENHAM
Transform Ltd.
KENT BEXLEY HEATH
Laskys.
KENT BROMLEY
Laskys.
KENT MAIDSTONE
Kent Microcomputers.
KENT MAIDSTONE
Laskys.
KENT ORPINGTON
Lever Computers.
KENT SEVENOAKS
Chalk Hill Computers &
Office Supplies.
KENT SWANLEY
Swanley Electronics.

KENT SIDCUP
Silica Shop.
KENT WELLING
K.E.C.M. Computers.
LANCS ACCRINGTON
PV Micros.
LANCS BLACKPOOL
Lewis's Ltd (Sound & Vision).
LANCS BOLTON
Computer World.
LANCS BURNLEY
Bytes And Pieces.
LANCS DARWEN
Grahams Micro Shop.
LANCS LANCASTER
Castle Computers.
LANCS LANCASTER
Online Computer Services.
LANCS OLDHAM
Home & Business Computers.
LANCS PRESTON
Lasky's.
LEICS HINCKLEY
Leigh Computer Systems.
LEICS LEICESTER
Dimension Computers.
LEICS LEICESTER
May's Hi Fi Ltd.
LEICS LEICESTER
Lewis's Ltd (Sound & Vision).
LEICS LEICESTER
Laskys.
LEICS LEICESTER
Data Nest.
LINCS GRANTHAM
OakLeaf.
LONDON BROCKLEY
Homeview Video.

LONDON NW4 Laskys.
LONDON NW5 Zoomsoft.
LONDON SW13 LEWISHAM
Laskys.
LONDON W5 EALING
Laskys.
LONDON W9 MAIDA VALE
Micro Monde Ltd.
LONDON W1 Compuface Ltd.
LONDON W1 Laskys.
LONDON W1 Laskys.
LONDON W1 Micro Anvika.
LONDON W1 Silica Shop.
LONDON W1 Selfridges.
LONDON W1
Computers of Wigmore St.
LOTHIAN EDINBURGH
Laskys.
LOTHIAN EDINBURGH
Silicon Centre.
LOTHIAN EDINBURGH
The Games Master Ltd.
MERSEYSIDE LIVERPOOL L1
Laskys.
MERSEYSIDE LIVERPOOL L2
Laskys.
MERSEYSIDE SOUTHPORT
Central Studios.
MERSEYSIDE ST HELENS
Microman Computers.
MIDDLESEX ENFIELD
Jennings Stores Ltd.
MIDDLESEX ENFIELD
Laskys.
MIDDLESEX NORTHWOOD
Screens.



THE ATARI 520ST Personal Computer has a list of qualifications as long as your arm. With a powerful 16 bit processor and 512k of memory linked to high resolution graphics and 512 colours its work is fast, clear and sharp on your screen, no matter how demanding the task.

Controlling the 520ST is easy through its mouse and unique operating system incorporating GEM desk top manager, whilst its eleven peripheral connectors including MIDI interface enables it to mix and communicate easily with other computer products.

The ST which presents itself in smart modern styling comes with powerful BASIC

L IFIED AND UNDERPAID.

plus Logo programming languages, a word processor and drawing programme, yet costs only £652* including disc drive and black and white monitor.

Why? Because at Atari we bring up our products to work hard for their living.

ATARI®

Power Without the Price™

*This price is exclusive of VAT.

GEM ® is a registered trademark of Digital Research.

MIDDLESEX PINNER
P & H Micro.
MIDDLESEX RUISLIP MANOR
Intech Software Ltd.
NORFOLK GT. YARMOUTH
The Micro Shop.
NORFOLK NORWICH
Tetranite (Spectrum).
N. YORKSHIRE YORKS
Laskys.
N. YORKSHIRE YORK
Microbridge.
N. YORKSHIRE YORKS
York Computer Centre.
N. YORKSHIRE RIPON
Arthur Yates Ltd.
NOTTS HUCKNALL
S P Electronics.
NOTTS MANSFIELD
Mansfield Computers.
NOTTS NOTTINGHAM
Intoto.
NOTTS NOTTINGHAM
Laskys.
NORTHANTS NORTHAMPTON
Laskys.
NORTHANTS NORTHAMPTON
Northampton Home Computers.
NOTTS REDDINGTON
GA Computers.
OXON HEADINGTON
Maddison Computers.
OXON OXFORD
Laskys.
OXON OXFORD
Selfridges.
ORKNEY STROMNESS
Get Taped.
PERTHSHIRE BLACKFORD.
Silicon Glen Ltd.
SHETLAND LERWICK
Tomorrows World.
S. GLAMORGAN CARDIFF
Cardiff Micro Computers.
S.GLAMORGAN CARDIFF
Laskys.
S. GLAMORGAN CARDIFF
South World Computers.
S. YORKSHIRE DONCASTER
Danum Computer Systems.
S. YORKSHIRE ROTHERHAM
Rotherham Computer Centre.
S. YORKSHIRE SHEFFIELD
Just Micro.
S. YORKSHIRE SHEFFIELD
Laskys.
STAFFS. STOKE-ON-TRENT
Lewis's Ltd (Sound & Vision).
STAFFS. STOKE-ON-TRENT
Town Computers.
STRATHCLYDE GLASGOW
Laskys.
STRATHCLYDE GLASGOW
Lewis's Ltd (Sound & Vision).
STATHCLYDE GLASGOW
Unitsoft.
SUFFOLK SUDBURY
Sudbury Microsystems.
SURREY CROYDON
Laskys.
SURREY FARNHAM
Farnham Computers.
SURREY GUILDFORD
Laskys.
SURREY KINGSTON
Laskys.
SURREY LEATHERHEAD
Evergreen Ltd.
SUSSEX BRIGHTON
Brighton Computer Exchange.
SUSSEX BRIGHTON
Brighton Computer Centre.
SUSSEX BRIGHTON
Laskys.
SUSSEX CRAWLEY
Laskys.
SUSSEX WORTHING
Data Direct.
TAYSIDE DUNDEE
Cursor Keys.
TAYSIDE DUNDEE
Micromania.
TAYSIDE PERTH
VICS.
TYNE AND WEAR GATESHEAD
Currie & Maughn.
TYNE AND WEAR
NEWCASTLE UPON TYNE
Laskys.
WARWICKS LEAMINGTON SPA
Spa Computer Centre.
WARWICKS NUNEATON
Micro City.
WARWICKS NUNEATON
Warwick Computers.
W. MIDLANDS BIRMINGHAM
Lewis's Ltd (Sound & Vision).
W. MIDLANDS BIRMINGHAM
Software Express.
W. MIDLANDS BIRMINGHAM
Laskys.
W.MIDLANDS BIRMINGHAM
Lee Computers.
W. MIDLANDS COVENTRY
Coventry Micro Centre.
W. MIDLANDS COVENTRY
Laskys.
W. MIDLANDS DUDLEY
Central Computers.
W. MIDLANDS
WOLVERHAMPTON
Laskys.
W. MIDLANDS
WOLVERHAMPTON
Micro Business Centre.
WORCS KIDDERMINSTER
Central Computers.
WORCS REDDITCH
Ampower Video and Computers.
W. GLAMORGAN SWANSEA
Bucon Ltd.
WEST LOTHIAN
LIVINGSTONE
Computer Centre.
W. YORKSHIRE BRADFORD
CNA Computing.
W. YORKSHIRE HALIFAX
Abacus Computers.
W. YORKSHIRE
HECKMONDWIKE
Thought & Crosses.
W. YORKSHIRE
HUDDERSFIELD
Microworld.
W. YORKSHIRE LEEDS 12
Farnells.
W. YORKSHIRE LEEDS 6
Interface Engineering Ltd.
W. YORKSHIRE LEEDS
Lewis's Ltd (Sound & Vision).
W. YORKSHIRE LEEDS
Laskys.
W. YORKSHIRE LEEDS
Micropower.

NOW FOR ASSEMBLY LANGUAGE

NOW let's look at the assembly language version of Alien Attack, the game developed with the use of the RAW assembler from last August's issue of *Atari User*.



Part II of STEPHEN WILLIAMSON's series on how to produce your own machine code games

The assembler puts machine code into memory after analysing assembly language mnemonics contained within DATA statements. Program I is a list of the DATA statements used to compile the first part of the game.

The mnemonics used by RAW are fairly standard, so if you are used to using a different Atari assembler you should have no difficulty.

There may be some minor differences, for example, the RAW assembler recognises indexed instructions such as STA 37682.Y, whereas most assemblers replace the full stop with a comma to give STA 37682,Y.

In case you are unfamiliar with assembly language, or only have a limited knowledge of the system, the adjacent panel gives a brief introduction to the subject and a list of the assembly language mnemonics used by Alien Attack are given elsewhere.

To keep things simple I have not used all the 6502 instruction set that is available to the programmer, nor have I used the hex number system.

Whereas Basic supports a large number of variables that can be used to store DATA, the 6502 chip can only handle two registers, X and Y, and one accumulator, A. It is therefore necessary at various points in a machine code program to store DATA in memory locations so that it can be retrieved later in the program.

Addresses in which Alien Attack DATA are stored in this way I refer to as stores. It is helpful to allocate areas of memory well away from the main program to act as stores.

In this way whenever you come across them in machine code programs you can recognise the addresses at once as being stores.

There are several locations in zero page, addresses 0 to 255, that are not used by the operating system, and I have used some of these as stores. For example, the current horizontal position of the ship is stored at address 204.

There is also a block of memory free at page 6, addresses 1536 to 1792, and I have also allocated some

6502 ASSEMBLY LANGUAGE

THE 6502 chip supports one accumulator, A, and two registers, X and Y. X, Y and A can be thought of as similar to variables in Basic, but with some important differences. They can hold any number between 0 and 255. Values can be added to or subtracted from the accumulator without any difficulty, though multiplication and division are more complex.

The X and Y registers can only be increased or decreased by one during any given operation. X and Y registers can be used as indexes. Where an address is followed by X or Y this indicates that this is an indexed operation.

For example, STA 37682.Y means store the contents of the accumulator in address 37682 plus whatever value is held in the Y register. Thus if Y holds a value of 10 and A a value of 100, then 100 is stored at address 37692 (37682+10).

Instructions followed by # mean that the operation is carried out in the immediate mode. Whatever is followed by the # sign is treated as a number and not an address. For example LDA #16 means load the accumulator with a value of 16 – this is similar to the Basic command A=16 – whereas LDA 1536 means load the accumulator with whatever value is stored at address 1536.

Instructions such as BEQ or BNE are branching instructions. If a branch instruction is followed by a number between 0 and 127 the program jumps forward. Followed by 128 to 256 the program jumps backwards. For example, the routine CMP 15, BEQ 13 means compare the accumulator with 15 and branch if equal 13 bytes forward. The routine CMP 15, BEQ 238 again compares the accumulator with 15, but branches if equal 256-238 or 18 steps backwards.

A number followed by .Z means that the number is an address in zero page (addresses 0 to 255). Thus STA 20.Z means store the contents of the accumulator at address 204.

```
150 REM *** ALIEN ATTACK ***
160 REM *** ASSEMBLEY LANGUAGE ***
170 REM *** by Stephen Williamson ***
180 DATA ORG 38916,LDA #85,STA 53260,L
DA #144,STA 54279,LDA #3,STA 53277,LDA
 #62,STA 559
190 DATA LDA #16,STA 1547,STA 1548,STA
 1549,LDA #5,STA 1546,LDA #118,STA 204
.Z,LDA #150,STA 205.Z
200 DATA .clr
210 DATA PLA,LDA #0,STA 207.Z,STA 210.
Z,NOP,NOP,NOP,NOP,NOP,NOP,NOP,NOP
220 DATA LDA #0,LDX #9,STA 53249.X,STA
 1536.X,DEX,BNE 247,STA 220.Z,STA 219.
Z
230 DATA LDY #0,LDA #0,STA 37632.Y,STA
 37888.Y,STA 38144.Y,STA 38400.Y,STA 3
8658.Y,INY,BNE 238
240 DATA LDA #239,STA 704,LDA #90,STA
705,LDA #26,STA 706,LDA #122,STA 707
250 DATA LDA #1,STA 53258
260 DATA .cont
270 DATA LDA 53279,CMP #7,BEQ 1,RTS,LD
A #0,STA 77
280 DATA JSR ship,JSR fire,JSR al1,JSR
 al2,JSR al3,JSR del,JSR bomb,JSR fire
,JSR coll,JMP cont
```

Listing I

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
150	4200	160	5483	170	8009
180	14252	190	16222	200	2447
210	12991	220	12800	230	15905
240	11678	250	3756	260	2555
270	7871	280	20913		

of these as stores.

It would perhaps have been enough to just use page 6 addresses, but I have included zero page addresses for demonstration purposes. Where memory is at a premium zero page addresses have the advantage of being only 1 byte long.

Figure I is a list of the stores used by Alien Attack.

The game is built up from a series of 12 short subroutines, each handling a different aspect of the game.

The first is used only once for each game and initialises the game. The rest of the subroutines are labelled according to their function.

The RAW assembler, like most assemblers, can handle up to 255 labels and this facility makes it much easier to write and edit machine code.

Figure II provides a list of these →

MNEMONICS USED IN ALIEN ATTACK

ADC	Add specified contents to accumulator.
ASL A	Shift left one bit of accumulator.
BCC	Branch if carry clear.
BCS	Branch if carry set.
BEQ	Branch if equal.
BNE	Branch if not equal.
CMP	Compare accumulator with specified contents.
CPX	Compare X with specified contents.
CPY	Compare Y with specified contents.
DEX	Decrease X by one.
DEY	Decrease Y by one.
INX	Increase X by one.
INY	Increase Y by one.
JMP	Jump to specified address.
JSR	Jump to subroutine and save return address.
LDA	Load accumulator with specified contents.
LDX	Load X with specified contents.
LDY	Load Y with specified contents.
LSR A	Shift right one bit of accumulator.
NOP	No operation.
PLA	Pull accumulator from stack.
RTS	Return from subroutine.
SBC	Subtract specified contents from accumulator.
STX	Store X in memory.
STY	Store Y in memory.
TAX	Transfer accumulator value to X.
TXA	Transfer value of X to accumulator.

204	Ship player horizontal coordinate.
205	Ship player vertical coordinate.
206	Alien 1 player horizontal coordinate.
207	Alien 1 player vertical coordinate.
208	Alien 1 player direction flag.
209	Alien 2 player horizontal coordinate.
210	Alien 2 player vertical coordinate.
211	Alien 2 player direction flag.
219	Alien 3 player horizontal coordinate.
220	Alien 3 player vertical coordinate.
221	Alien 3 player direction flag.
1536	Ship missile fire flag: 1 – on screen 0 – off screen.
1537	Ship missile vertical coordinate.
1538	Alien 1 missile flag: 4 – on screen 0 – off screen.
1539	Alien 1 missile vertical coordinate.
1540	Alien 2 missile flag: 16 – on screen 0 – off screen.
1541	Alien 2 missile vertical coordinate.
1542	Alien 3 missile flag: 64 – on screen 0 – off screen.
1543	Alien 3 missile vertical coordinate.
1544	Stores X register during explosion routine.
1545	Stores Y register during explosion routine.
1546	Number of lives left.
1547	Score (100s).
1548	Score (10s).
1549	Score (1s).

Label	Start address	Function
—	38916	Initialisation.
clr	38960	CLEAR – Clears stores and performs further initialisation routines.
cont	39039	Controls order in which subroutines are executed.
del	39801	Delay loop.
ship	39091	Controls movement of ship.
al1	39215	Controls movement of alien 1.
al2	39341	Controls movement of alien 2.
al3	39459	Controls movement of alien 3.
fire	39576	Detects press of fire button and controls movement of ship missile.
bomb	39682	Controls movement of alien missiles.
coll	39884	Detects if space ship is hit.
kill	40134	Detects if aliens are hit.

Figure II: Subroutines

20	Clock.
77	Attract mode clock.
559	Affects size of playfield and PM resolution.
632	Detects position of joystick 0 similar to STICK(0).
646	Detects if fire button has been pressed similar to STRIG(0).
704	Colour register of ship.
705	Colour register of alien 1.
706	Colour register of alien 2.
707	Colour register of alien 3.
710	Colour register of screen background.
24640-24679	Top row of screen display.
36864	PM Base address. This address is allocated by the program. Other programs using the PM system may use a different PM base address.
37632-39680	Data for PM shapes stored here.
53248	Horizontal position of ship.
53249	Horizontal position of alien 1.
53250	Horizontal position of alien 2.
53251	Horizontal position of alien 3.
53252	Horizontal position of ship missile.
53253	Horizontal position of alien 1 missile.
53254	Horizontal position of alien 2 missile.
53255	Horizontal position of alien 3 missile.
53256	Collision detection – ship missile to all aliens.
53257	Collision detection – alien 1 missile to ship.
53258	Collision detection – alien 2 missile to ship.
53259	Collision detection – alien 3 missile to ship.
53260	Collision detection – ship to aliens.
53277	A 3 stored at this address switches on PM system.
53278	0 stored at this address calls all collision detection addresses.
53279	Detects if START, SELECT or OPTION keys have been pressed. 7 – No key pressed, 6 – START key pressed, 5 – SELECT key pressed, 3 – OPTION key pressed.
53760	Pitch sound channel 0.
53761	Volume sound channel 0.
53762	Pitch sound channel 1.
53763	Volume sound channel 1.
53768	Affects sound clocking and filtering. Causes white noise explosion sound.

Figure III: Operating system addresses used by Alien Attack

labels and a brief description of what each subroutine does.

Figure III is a list of the relevant address of the Atari operating system that the program uses. Reference to this table will help in following the program.

Alien Attack makes extensive use of the player missile graphic system. In the following comments on the listing, Player 0 is referred to as the ship with players 1, 2 and 3 known as aliens 1, 2 and 3 respectively.

PM is used as an abbreviation for Player Missile.

INITIALISATION

Lines 180 and 190 initialise the game.

180

ORG 38916tells the RAW assembler where to start storing machine code in memory. 85 is stored at address 53260. This sets the size of all missiles to double normal size. 144 is stored at address 54279 to tell the PM system that the PM base address is 36864.

All the data for the PM shapes are stored from 36864 upwards. 3 is stored in address 53277 to turn on the PM system. 62 is stored at address 559 to give single line resolution PMs on a normal size playfield.

190

16 is stored in the score stores 1547, 1548, 1549 to put the character zero in these stores. A value of 5 is stored in address 1546 which holds the number of lives left. To increase this number, a higher one can be stored at 1546. 118 is stored in address 204 and is the horizontal starting coordinate of the ship. Similarly 150 stored at 205 is the vertical starting coordinate of the ship.

CLEAR

Lines 200 to 250 perform further initialisation functions and clear many of the stores before the game starts and also after each wave of aliens has been hit.

210

The machine code routines are called up from Basic by the command A=USR (38916). When the USR command is executed, the number of parameters passed to the machine code routine is put onto the stack. In the case of Alien Attack, no parameters are actually passed, but still a value of zero is put onto the stack.

The instruction PLA removes the 0 from the stack as this information is not needed by the program. This then leaves a two byte address at the top of the stack which is the return to Basic address. 0 is put into the Alien 1 and 2 stores to clear them off the screen.

The No Operation (NOP) instructions are useful in the developmental stage of a machine code program.

Initially this section of memory held other instructions, but were later not needed as they performed no useful function.

Instead of re-writing the routine 8 NOP instructions are placed to erase the unwanted instructions. This wastes eight bytes of memory, but this is a negligible amount, and the time taken to cycle through the NOP instructions is infinitesimal.

220

A loop puts 0 in all the horizontal player and missile position registers and clears most of the stores.

230

Another loop clears all the PM data area of any garbage that may have accumulated there.

240

The colours of the players and missiles are set up in the colour registers according to the formula:

colour x 16 brightness



250

A 1 is stored in address 53258 to set the size of Alien 2 to double size.

CONTROL

270

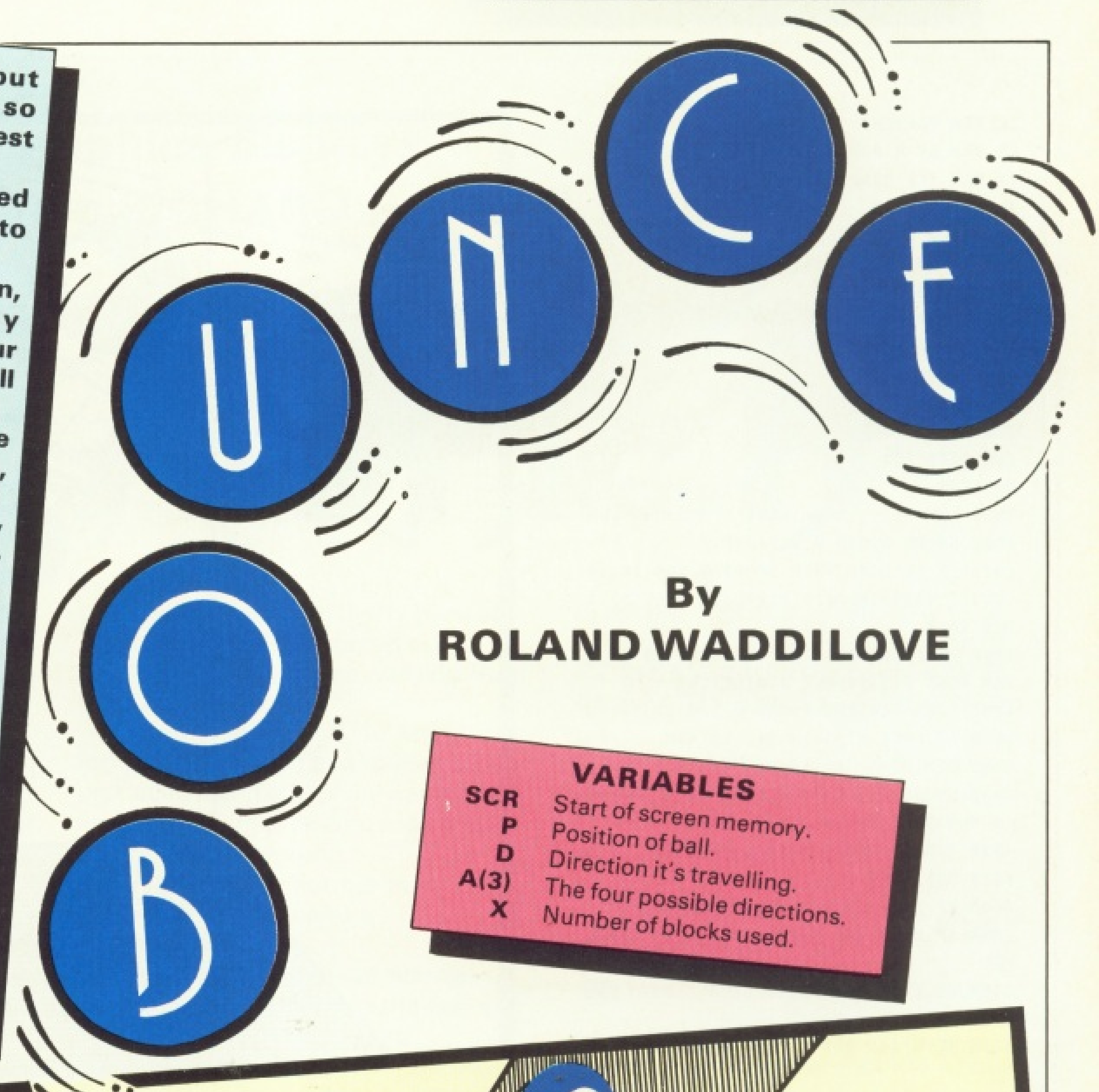
Address 53279 is looked at to see if a function key has been pressed. If START, SELECT or OPTION has been pressed then the Atari exits from machine code and control returns to Basic.

This routine is useful for de-bugging purposes during the developmental stage of machine code programs, for it means that you can exit from machine code without having to press the Reset key which can often result in the program being corrupted. 0 is stored at address 77. Without this routine the Atari would enter the attract mode after 10 minutes of playing Alien Attack.

280

This line calls up all the subroutines in the order that the game requires. Note that the fire routine is called twice. This means that the ship missile travels at approximately twice the speed of the alien missiles.

● *Next month we'll work through the remainder of the assembly language program.*



BOUNCE is an exciting, but frustrating game which is so simple that even the youngest Atari user will be able to play.

But be warned, you'll need plenty of practice and skill to reach the top level.

A ball rolls round the screen, bouncing off the walls. By pressing the fire button on your joystick, or any key, a block will be placed behind the ball.

What you have to do is trap the ball. It doesn't sound too difficult, but wait till you try it.

There's a very slight delay between pressing the button or key and the block being placed on the screen. This means you have to watch where the ball is going and press fire or a key just before the ball gets to the place you want the block.

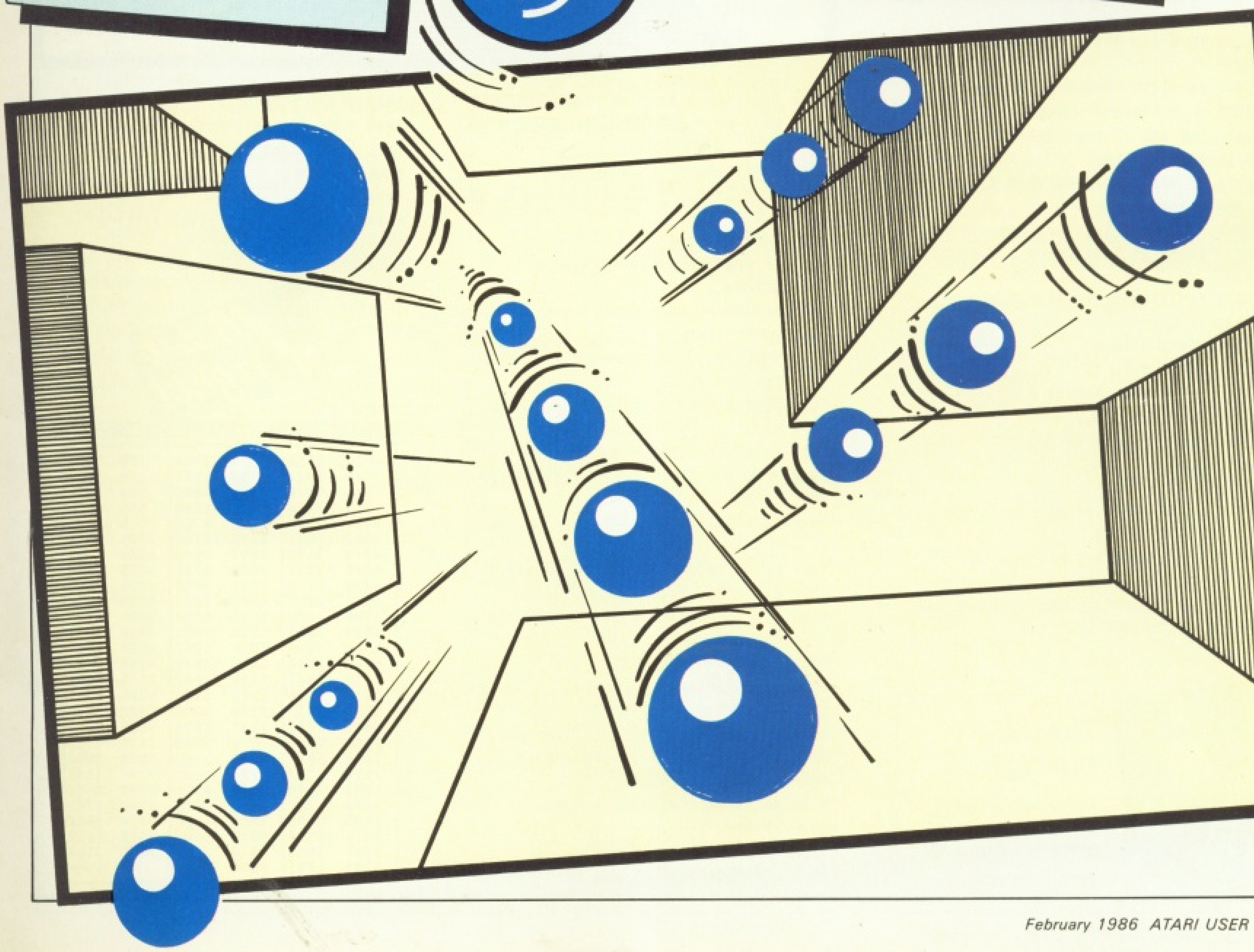
There are 15 balls and the idea is to use as few blocks as possible to trap them. The smaller the number, the higher your rating at the end of the game.

● Handy hint: Build traps for the ball, wait for it to bounce in, then place a block behind it so it can't get out.

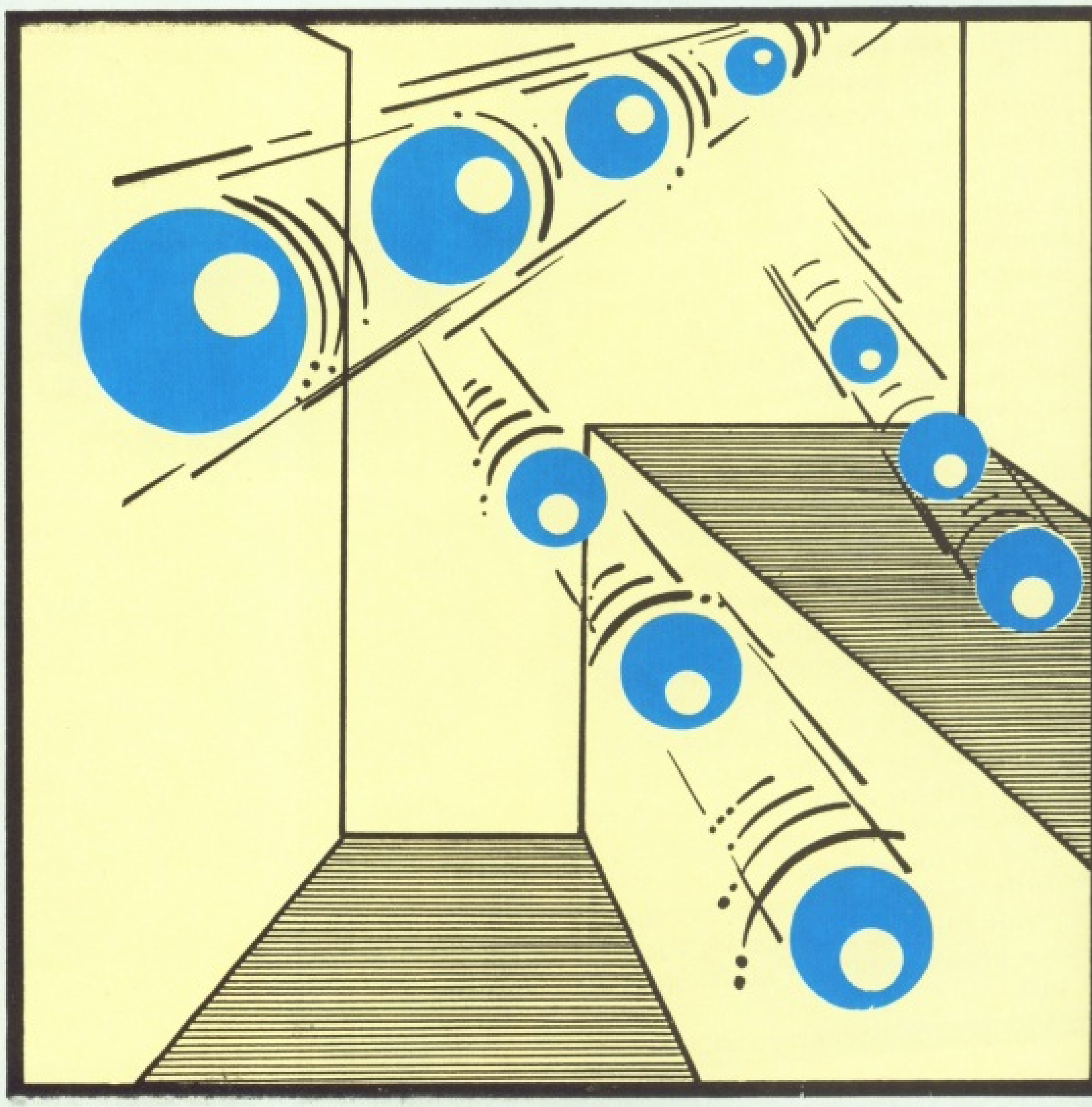
By
ROLAND WADDILOVE

VARIABLES

SCR	Start of screen memory.
P	Position of ball.
D	Direction it's travelling.
A(3)	The four possible directions.
X	Number of blocks used.



```
10 REM Bounce!
20 REM By R.A.Waddilove
30 REM (c) Atari User
40 GOSUB 7000
50 GOSUB 5000
100 GOSUB 9000
110 GOSUB 8000
170 GOSUB 1005:IF PEEK(P-1)=0 OR PEEK(
P+1)=0 OR PEEK(P-20)=0 OR PEEK(P+20)=0
 THEN 170
200 IF BALLS THEN 110
210 GOSUB 4000
300 GOTO 100
500 END
1000 REM ----- Move ball -----
1005 SOUND 0,0,0,0:Q=P:P=P+D
1010 IF PEEK(P) THEN SOUND 0,100,10,10
:D=A(INT(RND(0)*4)):P=Q+D:IF PEEK(P) T
HEN 1010
1060 IF PEEK(764)=255 AND STRIG(0)=1 T
HEN POKE P,130:POKE Q,0:RETURN
1100 POKE 764,255:SOUND 0,200,10,10:PO
KE Q,67:POKE P,130:X=X+1:RETURN
4000 REM ----- Rating -----
4010 SOUND 0,0,0,0:GRAPHICS 2:SETCOLOR
 2,0,0:POKE 755,0
4020 ? #6;" ***** rating *****"
4030 POSITION 6,5
4040 IF X<50 THEN ? #6;"brilliant"
4050 IF X>49 AND X<100 THEN ? #6;"  go
od"
4060 IF X>99 AND X<150 THEN ? #6;" ave
rage"
4070 IF X>149 AND X<200 THEN ? #6;"  p
oor"
4080 IF X>199 THEN ? #6;" abysmal"
4100 ? ,"  <press a key>"
4110 FOR I=1 TO 600:NEXT I
4200 POKE 764,255
4210 IF PEEK(764)=255 THEN 4210
4300 RETURN
5000 REM ----- Instructions -----
5005 GRAPHICS 2:SETCOLOR 2,0,0:POKE 75
5,0
5010 POSITION 6,2:? #6;"BOUNCE!":? ,"
 Atari  User"
5030 FOR I=0 TO 5
5040 FOR J=0 TO 15
5050 FOR K=0 TO 5:NEXT K
5055 SETCOLOR 0,3,J
5056 SOUND 0,J*15,10,J/2
5060 NEXT J
5070 NEXT I
5080 SOUND 0,0,0,0:GRAPHICS 1:SETCOLOR
 2,0,0:POKE 755,0
5090 POSITION 6,0:? #6;"bounce!"
5100 POSITION 2,4:? #6;"CAN YOU TRAP T
HE":? #6:? #6;"BALL THAT'S BOUNCING":?
 #6;" AROUND THE SCREEN?"
```



```
5110 POSITION 3,12:? #6;"press a key o
r":? #6:? #6;" the fire button to":? #
6:? #6;"   place a block"
5115 ? #6:? #6;"      behind it"
5120 ? :? :? "        <press a key to st
art>";
5200 POKE 764,255
5210 IF PEEK(764)=255 THEN 5210
5300 RETURN
7000 REM ----- Initialise -----
7005 J=PEEK(106)-4
7010 POKE 106,J:GRAPHICS 0
7050 FOR I=0 TO 31
7060 READ N:POKE I+J*256,N
7070 NEXT I
7075 DATA 0,0,0,0,0,0,0,0
7080 DATA 255,129,129,129,129,129,129,
255
7082 DATA 60,126,255,255,255,255,126,6
0
7084 DATA 170,85,170,85,170,85,170,85
7110 DIM A(3)
7120 A(0)=-1:A(1)=1:A(2)=-20:A(3)=20
7200 RETURN
8000 REM ----- New ball -----
8010 P=SCR+INT(RND(0)*20*24)
8020 IF PEEK(P) THEN 8010
8030 IF PEEK(P-1) AND PEEK(P+1) AND PE
EK(P-20) AND PEEK(P+20) THEN 8010
8050 D=A(INT(RND(0)*4))
8060 BALLS=BALLS-1:POKE 764,255
8200 RETURN
9000 REM ----- Screen -----
9020 GRAPHICS 17:POKE 756,PEEK(106)
9030 SCR=PEEK(88)+256*PEEK(89)
9040 ? #6;"!!!!!!!!!!!!!!!!!!!!";
9050 FOR N=1 TO 22
9060 ? #6;"!                  !";
9070 NEXT N
9080 ? #6;"!!!!!!!!!!!!!!!!!!!!";
9100 BALLS=15:X=0
9500 RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	2612	20	4908	30	3991
40	1943	50	1937	100	1949
110	1946	170	14060	200	2981
210	1934	300	1608	500	836
1000	5240	1005	4308	1010	14320
1060	12013	1100	12104	4000	4109
4010	9192	4020	4544	4030	2366
4040	9447	4050	8722	4060	9978
4070	8773	4080	9009	4100	4560
4110	3895	4200	2121	4210	4433
4300	1498	5000	6207	5005	6967
5010	9061	5030	2086	5040	2287
5050	3710	5055	2867	5056	3503
5060	1347	5070	1345	5080	9187
5090	5443	5100	17687	5110	38101
5115	8225	5120	8166	5200	2121
5210	4437	5300	1498	7000	5512
7005	2282	7010	4094	7050	2276
7060	3886	7070	1345	7075	3124
7080	5652	7082	5469	7084	5054
7110	1317	7120	4693	7200	1498
8000	4556	8010	4229	8020	3693
8030	11709	8050	3026	8060	4752
8200	1498	9000	4094	9020	5641
9030	4511	9040	3109	9050	2285
9060	3054	9070	1355	9080	3109
9100	2251	9500	1498		

Brighten up your graphics displays with this routine from RICHARD PARKES



SOME computers have a Basic command allowing colours to be flashed, but despite the Atari's range of Basic graphics commands it lacks this facility.

The effect could be implemented in Basic by using the SETCOLOR command to change a colour register between two different hues and luminances, but this is often awkward.

It would be much easier just to tell the computer which colour register to flash, between which two colours, and at what speed – and this is what my program does.

The machine code routine uses a vertical blank interrupt (VBI) so once the flash for a particular colour register has been set there is no need to worry about it until the flash is to be turned off.

Listing I is the assembly listing of the routine, and for non-machine code programmers I've given a Basic demonstration program, Listing II.

The machine code data is POKEd into page 6 in line 10, the data being read from lines 20 to 70. The USR call in line 10 sets up the VBI and the variables FLASHON and FLASHOFF are initialised to make calling routines easier. Their values should not be changed during the program.

To get the colour register to flash use:

A=USR(FLASHON,REG, COL1,COL2,SPEED)

where A can be any variable.

REG is the register number. A number 0 to 4 stands for the respective colour registers. A 5 will access location 755 – this can be changed to produce different effects in character graphics modes (a number greater than 5 will be ignored).

COL1 and COL2 are the two colours or values to flash between. The colour value is worked out as the hue*16+luminance, so varying from 0 to 255.

When register 5 is used the following effects in text modes can be produced using one of the parameters as shown (apply to Graphics 0 only, except where stated):

0 Inverse text to normal text.
1 Inverse text to blanks.
2 Normal setting.
3 Inverse text to inverse blanks.
4 Vertical reflect (all text modes) and inverse text to normal text.
5 Vertical reflect (all text modes).
7 Vertical reflect (all text modes) and inverse text to inverse blanks.

SPEED alters the frequency of the flash as follows:

0 and 1: Fast flickery effect.
2 and 3: Flashes of the same speed.
4 to 7: Flashes of the same speed, half the speed of 2 and 3.
8 to 15: Half the speed of 4 to 7.
16 to 31: Half the speed of 8 to 15.
32 to 63: Half the speed of 16 to 31.
64 to 127: Half the speed of 32 to 63.

Different values within the ranges are used so that the flashes can occur at the same rate but out of synchronisation from one another, as shown in the example program.

This USR call is used to stop a register from flashing:

A=USR(FLASHOFF,REG,COL)

where A is any variable.

REG is the register number (0 to 5 – a number greater than 5 will be ignored as before) and COL is the value that the register is to retain.

Note that using SETCOLOR or a GRAPHICS command to reset a colour register will not work while the register is being flashed as the flash routine will overwrite the command.

Listing I

```
0000        99          .OPT NOEJECT
            0100 ;ASSEMBLER LISTING
            0110 ;OF COLOUR FLASH
0000        0120        *=   $600
            0130 ;
            0140 ;SET UP VBI
0600 68     0150        PLA
            0160 ;RESET FLAGS
0601 A900   0170        LDA  #0
0603 A205   0180        LDX  #5
0605 9D9D06 0190 LOOP1  STA  FLAG,X
0608 CA     0200        DEX
0609 10FA   0210        BPL  LOOP1
            0220 ;SET REGISTERS FOR VBI
060B A907   0230        LDA  #7
060D A206   0240        LDX  #6
060F A015   0250        LDY  #VBI&$00FF
0611 205CE4 0260        JSR  $E45C
0614 60     0270        RTS
            0280 ;
            0290 ;VBI START
0615 EEA906 0300 VBI    INC  TIMER
            0310 ;LOOP TO CHANGE COLOURS
0618 A205   0320        LDX  #5
061A BD9D06 0330 MAINLP LDA  FLAG,X
            0340 ;TEST IF FLASH IS SET
061D 102D   0350        BPL  NFLASH
            0360 ;LOOP TO FIND "NO. OF
            0370 ;BITS" OF LENGTH
061F A000   0380        LDY  #0
0621 BDA306 0390        LDA  LENGTH,X
0624 C8     0400 SHFTLP INY
0625 4A     0410        LSR  A
0626 D0FC   0420        BNE  SHFTLP
            0430 ;NOW FIND IF NEED TO
            0440 ;CHANGE COLOUR THIS VBI
0628 BDA306 0450        LDA  LENGTH,X
062B 4DA906 0460        EOR  TIMER
062E 4A     0470 TESTLP LSR  A
062F B01B   0480        BCS  NFLASH
0631 88     0490        DEY
0632 D0FA   0500        BNE  TESTLP
            0510 ;FIND WHICH COLOUR TO
            0520 ;CHANGE TO
0634 4A     0530 CHAFLA LSR  A
0635 B005   0540        BCS  DICOL2
0637 BD9106 0550        LDA  COL1,X
063A 9003   0560        BCC  COLSWP
063C BD9706 0570 DICOL2 LDA  COL2,X
063F E005   0580 COLSWP CPX  #5
            0590 ;IF X IS 5 THEN
            0600 ;CHARACTER FLASH
0641 F006   0610        BEQ  CHRFLA
0643 9DC402 0620        STA  708,X
0646 18     0630        CLC
0647 9003   0640        BCC  NFLASH
0649 8DF302 0650 CHRFLA STA  755
064C CA     0660 NFLASH DEX
```

```
064D 10CB   0670         BPL  MAINLP
            0680 ;RETURN FROM VBI
064F 4C62E4 0690         JMP  $E462
            0700 ;
            0710 ;FLASH ON
0652 68     0720         PLA
0653 68     0730         PLA
0654 68     0740         PLA
            0750 ;COLOUR REGISTER NO.
0655 C906   0760         CMP  #6
            0770 ;FIND IF >=6
            0780 ;IF SO GO TO NOREG1
0657 B031   0790         BCS  NOREG1
            0800 ;STORE IN X REGISTER
0659 AA     0810         TAX
065A 68     0820         PLA
065B 68     0830         PLA
065C 9D9106 0840         STA  COL1,X
065F 68     0850         PLA
0660 68     0860         PLA
0661 9D9706 0870         STA  COL2,X
0664 68     0880         PLA
0665 68     0890         PLA
0666 9DA306 0900         STA  LENGTH,X
0669 A980   0910         LDA  #128
            0920 ;SET FLAG FOR FLASH
066B 9D9D06 0930         STA  FLAG,X
066E 60     0940         RTS
            0950 ;
            0960 ;FLASH OFF
066F 68     0970         PLA
0670 68     0980         PLA
0671 68     0990         PLA
            1000 ;COLOUR REGISTER NO.
0672 C906   1010         CMP  #6
            1020 ;FIND IF >=6
            1030 ;IF SO GO TO NOREG2
0674 B018   1040         BCS  NOREG2
            1050 ;STORE IN X REGISTER
0676 AA     1060         TAX
0677 A900   1070         LDA  #0
            1080 ;RESET FLASH FLAG
0679 9D9D06 1090         STA  FLAG,X
067C 68     1100         PLA
067D 68     1110         PLA
067E E005   1120         CPX  #5
0680 F004   1130         BEQ  KCHFL
            1140 ;RESET COLOUR REGISTER
0682 9DC402 1150         STA  708,X
0685 60     1160         RTS
            1170 ;RESET CHARACTER REG.
0686 8DF302 1180 KCHFL   STA  755
0689 60     1190         RTS
            1200 ;
068A 68     1210 NOREG1  PLA
068B 68     1220         PLA
068C 68     1230         PLA
068D 68     1240         PLA
068E 68     1250 NOREG2  PLA
068F 68     1260         PLA
0690 60     1270         RTS
            1280 ;
            1290 ;
            1300 ;DATA
0691 00     1310 COL1    .BYTE 0,0,0,0,0,
0
0692 00
0693 00
0694 00
0695 00
0696 00
0697 00     1320 COL2    .BYTE 0,0,0,0,0,
0
0698 00
0699 00
069A 00
069B 00
069C 00
069D 00     1330 FLAG    .BYTE 0,0,0,0,0,
0
069E 00
069F 00
06A0 00
06A1 00
06A2 00
06A3 00     1340 LENGTH .BYTE 0,0,0,0,0,
0
06A4 00
06A5 00
06A6 00
06A7 00
06A8 00
06A9 00     1350 TIMER   .BYTE 0
```

Listing II

```
1 REM ###       FLASHER       ###
2 REM ### by Richard Parkes ###
5 REM FLASH ROUTINE LINES 10 TO 70
10 FOR J=1536 TO 1705:READ A:POKE J,A:
NEXT J:A=USR(1536):FLASHON=1618:FLASHO
FF=1647
20 DATA 104,169,0,162,5,157,157,6,202,
16,250,169,7,162,6,160,21,32,92,228,96
,238,169,6,162,5,189
30 DATA 157,6,16,45,160,0,189,163,6,20
0,74,208,252,189,163,6,77,169,6,74,176
,27,136,208,250,74,176,5
40 DATA 189,145,6,144,3,189,151,6,224,
5,240,6,157,196,2,24,144,3,141,243,2,2
02,16,203,76,98,228
50 DATA 104,104,104,201,6,176,49,170,1
04,104,157,145,6,104,104,157,151,6,104
,104,157,163,6,169,128,157,157
60 DATA 6,96,104,104,104,201,6,176,24,
170,169,0,157,157,6,104,104,224,5,240,
4,157,196,2,96,141,243
70 DATA 2,96,104,104,104,104,104,104,9
6,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0
100 REM DEMONSTRATION FOR FLASH
110 REM
120 GRAPHICS 18
130 POSITION 7,1:? #6;"flash"
135 POSITION 7,2:FOR J=1 TO 5:? #6;CHR
$(10);:NEXT J
140 POSITION 7,3:? #6;"DEMO"
145 POSITION 7,4:? #6;"*****"
150 POSITION 7,5:? #6;"ONE"
155 POSITION 7,6:FOR J=1 TO 5:? #6;CHR
$(138);:NEXT J
160 POSITION 7,7:? #6;"OF"
165 POSITION 7,8:? #6;"*****"
170 POSITION 7,9:? #6;"sMAC"
175 C1=12:C2=0
180 A=USR(FLASHON,1,C1,C2,16)
190 A=USR(FLASHON,2,C1,C2,20)
200 A=USR(FLASHON,3,C1,C2,24)
210 A=USR(FLASHON,0,C1,C2,28)
220 GOSUB 1000
230 IF C1<>148 THEN C1=148:C2=52:GOTO
180
240 POSITION 7,2:? #6;"     "
250 POSITION 7,4:FOR J=1 TO 104:? #6;"
";:NEXT J
260 A=USR(FLASHOFF,0,40)
270 A=USR(FLASHOFF,2,202)
280 A=USR(FLASHOFF,3,70)
290 POSITION 7,5:? #6;"MY"
300 POSITION 7,7:? #6;"DIFFERENT"
310 POSITION 7,9:? #6;"sMEdS"
320 A=USR(FLASHON,4,148,52,32)
330 GOSUB 1000
340 A=USR(FLASHOFF,4,0)
350 A=USR(FLASHON,2,202,12,8)
360 A=USR(FLASHON,3,70,246,32)
370 A=USR(FLASHON,0,40,200,64)
380 GOSUB 1000
390 GRAPHICS 0:POKE 752,1
400 POSITION 5,5:? "*****************
**************"
410 Y=6:GOSUB 2000
420 POSITION 5,7:? "*            FOLDAGS
ON           *"
430 GOSUB 2000
440 POSITION 5,9:? "*  DIFFERENT COLOUR
CHARACTERS  *"
450 GOSUB 2000
460 POSITION 5,11:? "*            USING
ONE          *"
470 GOSUB 2000
480 POSITION 5,13:? ;"*           REGIST
ERSTERS  .   *"
490 GOSUB 2000
500 POSITION 5,15:? "*                 5
             *"
510 GOSUB 2000
520 POSITION 5,17:? "*****************
**************":POSITION 38,23
530 A=USR(FLASHON,5,2,4,64)
540 GOSUB 1000
550 A=USR(FLASHOFF,0,40)
560 A=USR(FLASHOFF,1,202)
570 A=USR(FLASHOFF,2,148)
580 A=USR(FLASHOFF,3,70)
590 A=USR(FLASHON,5,3,0,32)
600 GOSUB 1000
610 A=USR(FLASHON,5,1,0,8)
620 GOSUB 1000
630 A=USR(FLASHON,5,0,2,16)
640 GOSUB 1000
650 A=USR(FLASHOFF,5,2)
660 GOTO 120
1000 FOR J=1 TO 1000:NEXT J:RETURN
2000 POSITION 5,Y:? "*
             *":Y=Y+2:RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	4299	2	6519	5	6303
10	14929	20	14064	30	14748
40	13974	50	15541	60	14318
70	12460	100	5580	110	871
120	2152	130	5195	135	8600
140	5781	145	6165	150	5181
155	8850	160	3911	165	4257
170	5297	175	1722	180	4657
190	4632	200	4653	210	4670
220	1925	230	6482	240	4089
250	8139	260	3956	270	4043
280	3974	290	4399	300	6599
310	5869	320	4735	330	1925
340	3872	350	4616	360	4692
370	4671	380	1925	390	3968
400	18958	410	2765	420	9244
430	1928	440	13725	450	1928
460	9562	470	1928	480	11833
490	1928	500	7450	510	1928
520	22083	530	4296	540	1925
550	3956	560	4041	570	4065
580	3974	590	4267	600	1925
610	4080	620	1925	630	4276
640	1925	650	3882	660	1614
1000	5878	2000	9774		

GET IN THE PICTURE

MIKE ROWE shows how you can load and view pictures tucked away in commercial discs in non-DOS format

PROGRAM MAP

100-150	Get command.
300-320	Format a disc.
400-470	Get directory.
500-530	Load DOS format or cassette file.
600-630	Save DOS format or cassette file.
700-710	Load block of disc sectors.
800-810	Save block of disc sectors.
900-940	Full screen routine.
900	Change to full screen display list.
920	Wait until a key is pressed.
930	Cancel pressed key and switch back to split screen display list.
940	Back to get loop.
1000-1230	Read in machine code.
1000-1030	Read in Sector load/save routine.
1040-1140	Sector load/save machine code data.
1200	Read in file load/save routine.
1210-1220	File load/save machine code data.
2000-2020	Sub-routine to print command lines.
2200	Load File.
2300	Save File.
2400	Save Disc sectors.
2500	Load Disc sectors.
3000-3200	Initialise display lists.
3000	Start with graphics mode 8+16.
3010	Use a string DL$ for second display list. Find address of start of DL$.
3020	Switch off display to speed up.
3030	Find start of original display list.
3040-3100	Change original display list from Graphics 8 to 15. This allows the program to run on the 400/800 which do not support graphics Mode 15 normally.
3110	Find start of screen memory (same for both display lists).
3120	Copy original display list to DL$.
3130	Make two changes to DL$ to tell display list where it starts.
3140	Having created first display list restart with graphics 8 to get text window.
3145-3190	Convert to graphics 15.
5000	Error handling routine.

THIS Micropainter transfer program enables you to manipulate Micropainter or other standard 62 sector graphics files.

Program I will allow you to transfer Micropainter files between DOS files, cassette files, and disc sectors.

Many commercial discs contain Micropainter-style files in non-DOS format, but saved as continuous sectors. This program will enable you to load and view these pictures.

When you first run Program I the screen will go black for about 30 seconds. It will then display a blank screen with instruction lines below. You can now load a picture by pressing 1 or 3 and Return.

If you press 1 you will be asked for a filename. If you want to load a DOS file enter D:filename or enter C: for a cassette file.

If you press 3 you will be asked for the start sector. This will tell the program which disc sector to start loading from.

The last option is the one to use to load from a commercial disc. To do this when you are asked for the sector number initially enter 1.

If no recognisable part of a picture is seen next time enter 100, then 200 and so on up to 600.

If no portion of a picture is seen than there is no standard picture on the disc. If a picture is found you usually only have part of it, so keep changing the sector number until you find the correct sector to load the picture fully.

Many commercial discs contain

protection and part of the disc may be unreadable. If this is the case the program will restart and you can enter a different sector.

When you have a picture loaded you can press Return to toggle between a partial picture and the full one.

Saving a picture is just as easy. Pressing 2 will save the picture as a file. Again you will be asked for a filename.

To save to disc enter D:filename, to save to cassette enter C: If you want to save a picture directly to disc as a non-DOS file press 4 and enter the start sector as requested.

However beware, this option can write over any other information on a disc and erase it, so use it carefully.

There are two other disc commands. D which will produce a disc directory. To pause the rather rapid display of this press Ctrl-1 and press it again to resume printing.

The final command is F which after confirming the request will format the disc. Note that this will also erase the disc in your drive!

The program is not designed to handle the colours of the picture properly and will display only the default colours. This is because pictures saved as sectors or on tape have often lost their colour data and it is primarily these that the program is designed to deal with.

Also the program is only intended to work in single density format and may not work with double density.

Program II is a short Basic program to set up and load a micropainter file. The screen takes a while to set up as the 400/800 machines do not support the correct graphics mode from Basic.

Again, the program when run will ask for a filename. These can be D:filename or disc or C: for cassette. It will then load and display the picture.

MAIN VARIABLES

A$	Used to get command input and also file names.
DL$	String used to hold second (full screen) display list.
DL	Start of full screen display list.
DLL	Low byte of this.
DLH	High byte of this.
DLIST	Start of split screen display list.
DLIL	Low byte of this.
DLIH	High byte of this.
START	Sector to start from.
BUF	Address of screen memory.
NO	Number of sectors to load.

SOFTWARE FOR THE ATARI ST

METACOMCO PRESENTS ITS NEW RANGE OF SOFTWARE FOR THE ATARI ST: A SET OF POWERFUL PROGRAMMING LANGUAGES FOR PEOPLE WHO WANT TO WRITE PROGRAMS FOR THE ST.

▶ *MACRO ASSEMBLER* **£49.95**

A high specification macro assembler, complete with linker and screen editor. Assembler is a fundamental language, useful for all kinds of programming - particularly where speed and compactness are important. Essential for all serious programmers who want to exploit the ST's full potential.

▶ *MCC PASCAL* **£89.95**

A powerful Pascal compiler designed to meet the exacting ISO standard. This Pascal is already widely used on the Sinclair QL and the Commodore Amiga. A fast, single pass compiler, generating native code. Full interface with GEMDOS libraries allows windows, icons, menus, etc. to be programmed using Pascal. Complete with screen editor and an extensive user manual.

▶ *LATTICE C* **£99.95**

The well known Lattice C compiler: a full Kernighan and Ritchie implementation with comprehensive libraries of UNIX and utility functions and including a complete interface to GEMDOS features. C is the ideal language for program development.

ALL METACOMCO'S LANGUAGES FOR THE ATARI ST INCLUDE METACOMCO'S POPULAR SCREEN EDITOR, AND A DETAILED MANUAL.

▶ Metacomco are leading suppliers of systems software for 68000 based microcomputers. As well as these titles for the Atari ST, Metacomco have a very successful range of programming languages for the Sinclair QL, now widely used throughout the world. Metacomco was also chosen by Commodore to provide the operating system and a suite of languages for the new Amiga computer.

METACOMCO

26 PORTLAND SQUARE, BRISTOL BS2 8RZ, UK.
TELEPHONE: BRISTOL (0272) 428781
In the USA, call 1-800-252-6382

Lattice is a trademark of LATTICE INC. GEMDOS is a trademark of DIGITAL RESEARCH INC. UNIX is a trademark of AT+T Bell Laboratories. Prices include VAT and P&P UK mainland only. Delivery allow up to 28 days.

PHONE TODAY, OR POST THIS COUPON TO: METACOMCO, 26 PORTLAND SQUARE, BRISTOL BS2 8RZ.

PLEASE SEND ME:

MACRO ASSEMBLER £49.95 ☐
FOR THE ATARI ST

MCC PASCAL £89.95 ☐
FOR THE ATARI ST

LATTICE C £99.95 ☐
FOR THE ATARI ST

MORE INFORMATION ☐

I ENCLOSE A CHEQUE FOR £ ____________ OR DEBIT
MY ACCESS/VISA NO. ________________

CARD EXPIRY DATE ________________

NAME ________________

ADDRESS ________________

SIGNATURE ________________

POSTCODE ________________ TEL. NO ________________

AU4

Program I

```
0 REM MICROPAINTER TRANSFER PROGRAM
1 REM By Mike Rowe
5 POKE 559,0:TRAP 5000
10 GOSUB 1000:GOSUB 3000
20 DIM A$(20)
30 POKE 559,34
100 GOSUB 2000:INPUT A$
110 IF A$="1" THEN 500
120 IF A$="2" THEN 600
130 IF A$="3" THEN 700
140 IF A$="4" THEN 800
145 IF A$="D" THEN 400
146 IF A$="F" THEN 300
150 GOTO 900
300 ? "FORMAT DISK !- ARE YOU SURE";
:INPUT A$:IF A$<>"Y" THEN 100
310 XIO 254,#2,0,0,"D:"
320 GOTO 100
400 OPEN #2,6,0,"D:*.*"
410 TRAP 460
420 INPUT #2,A$:? A$;"  ";:INPUT #2,A$
:? A$:GOTO 420
460 CLOSE #2:INPUT A$
470 TRAP 5000:GOTO 100
500 ? "K":? "ENTER MICROPAINTER FILENA
ME TO LOAD":INPUT A$
510 CLOSE #1:OPEN #1,4,0,A$
520 GOSUB 2200:CLOSE #1
530 GOTO 100
600 ? "K":? "ENTER MICROPAINTER FILENA
ME TO SAVE":INPUT A$
610 CLOSE #1:OPEN #1,8,0,A$
620 GOSUB 2300:CLOSE #1
630 GOTO 100
700 ? "ENTER SECTOR # TO LOAD FROM":IN
PUT A$:START=VAL(A$)
710 GOSUB 2500:GOTO 100
800 ? "ENTER SECTOR # TO SAVE TO":INPU
T A$:START=VAL(A$)
810 GOSUB 2400:GOTO 100
900 POKE 560,DLL:POKE 561,DLH
910 POKE 764,255
920 IF PEEK(764)=255 THEN 920
930 POKE 764,255:POKE 560,DLIL:POKE 56
1,DLIH
940 GOTO 100
1000 FOR X=1600 TO 1687
1030 READ Y:POKE X,Y:NEXT X
1040 DATA 32,68,218,104,201,5,208,74
1050 DATA 104,104,141,1,3,104,104,141
1060 DATA 2,3,104,141,11,3,104,141
1070 DATA 10,3,104,133,204,104,133,203
1080 DATA 104,141,5,3,104,141,4,3
1090 DATA 32,83,228,48,35,173,4,3
1100 DATA 24,105,128,141,4,3,173,5
1110 DATA 3,105,0,141,5,3,238,10
1120 DATA 3,208,3,238,11,3,198,203
1130 DATA 208,222,198,204,16,218,160,1
1140 DATA 132,212,96,169,0,141,23,60
1200 FOR X=1536 TO 1589:READ Y:POKE X,
Y:NEXT X
1210 DATA 104,104,104,141,9,6,162,16,1
69,7,157,66,3,165,88,157,68,3,165,89,1
57,69,3,169,0
1220 DATA 157,72,3,169,31,157,73,3,32,
86,228,169,12,157,66,3,32,86,228,96,0,
0,0,0,0,0,0,0,0
1230 RETURN
2000 ? "K":? "1 - LOAD FILE    2 - SAV
E FILE"
2010 ? "3 - LOAD SECTORS 4 - SAVE SECT
ORS"
2020 RETURN
2200 Q=USR(1536,7):RETURN :REM LOAD
2300 Q=USR(1536,11):RETURN :REM SAVE
2400 Q=USR(1600,1,87,START,NO,BUF):RET
URN
2500 Q=USR(1600,1,82,START,NO,BUF):RET
URN
3000 GRAPHICS 24:POKE 559,0
3010 DIM DL$(250):DL=ADR(DL$):DLH=INT(
ADR(DL$)/256):DLL=DL-DLH*256
3020 POKE 559,0
3030 DLIH=PEEK(561):DLIL=PEEK(560):DLI
ST=DLIH*256+DLIL
3040 POKE DLIST+3,78
3070 FOR I=DLIST+6 TO DLIST+198
3080 IF PEEK(I)=15 THEN POKE I,14
3090 IF PEEK(I)=79 THEN POKE I,78
3100 NEXT I
3110 BUF=PEEK(88)+256*PEEK(89):NO=61
3120 FOR I=1 TO 201:DL$(I)=CHR$(PEEK(D
LIST+I-1)):NEXT I
3130 DL$(201,201)=CHR$(DLH):DL$(202,20
2)=CHR$(DLL)
3140 GRAPHICS 8:POKE 559,0
3145 DLIH=PEEK(561):DLIL=PEEK(560):DLI
ST=DLIH*256+DLIL
3150 POKE DLIST+3,78
3160 FOR I=DLIST+6 TO DLIST+198
3170 IF PEEK(I)=15 THEN POKE I,14
3180 IF PEEK(I)=79 THEN POKE I,78
3190 NEXT I
3195 DL=ADR(DL$):DLH=INT(ADR(DL$)/256)
:DLL=DL-DLH*256
3200 RETURN
5000 ? "K":? "ERROR - ";PEEK(195):INPU
T A$:GOTO 100
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
0	7196	1	3717	5	3671
10	3886	20	1593	30	1974
100	3764	110	3023	120	3029
130	3035	140	3041	145	3097
146	3103	150	1624	300	16960
310	2982	320	1608	400	3160
410	1596	420	8099	460	3352
470	3454	500	10962	510	3935
520	3654	530	1608	600	11023
610	3951	620	3658	630	1608
700	10525	710	3735	800	9927
810	3731	900	4703	910	2121
920	4356	930	7503	940	1608
1000	3095	1030	4550	1040	4863
1050	4898	1060	4611	1070	5131
1080	4405	1090	4527	1100	4666
1110	4205	1120	4689	1130	5144
1140	4865	1200	7810	1210	12924
1220	12916	1230	1498	2000	7286
2010	7629	2020	1498	2200	5958
2300	5964	2400	7218	2500	7213
3000	4109	3010	10082	3020	1867
3030	9789	3040	3007	3070	4788
3080	4877	3090	4945	3100	1345
3110	5606	3120	8976	3130	7611
3140	4023	3145	9789	3150	3007
3160	4788	3170	4877	3180	4945
3190	1345	3195	9042	3200	1498
5000	8294				

Program II

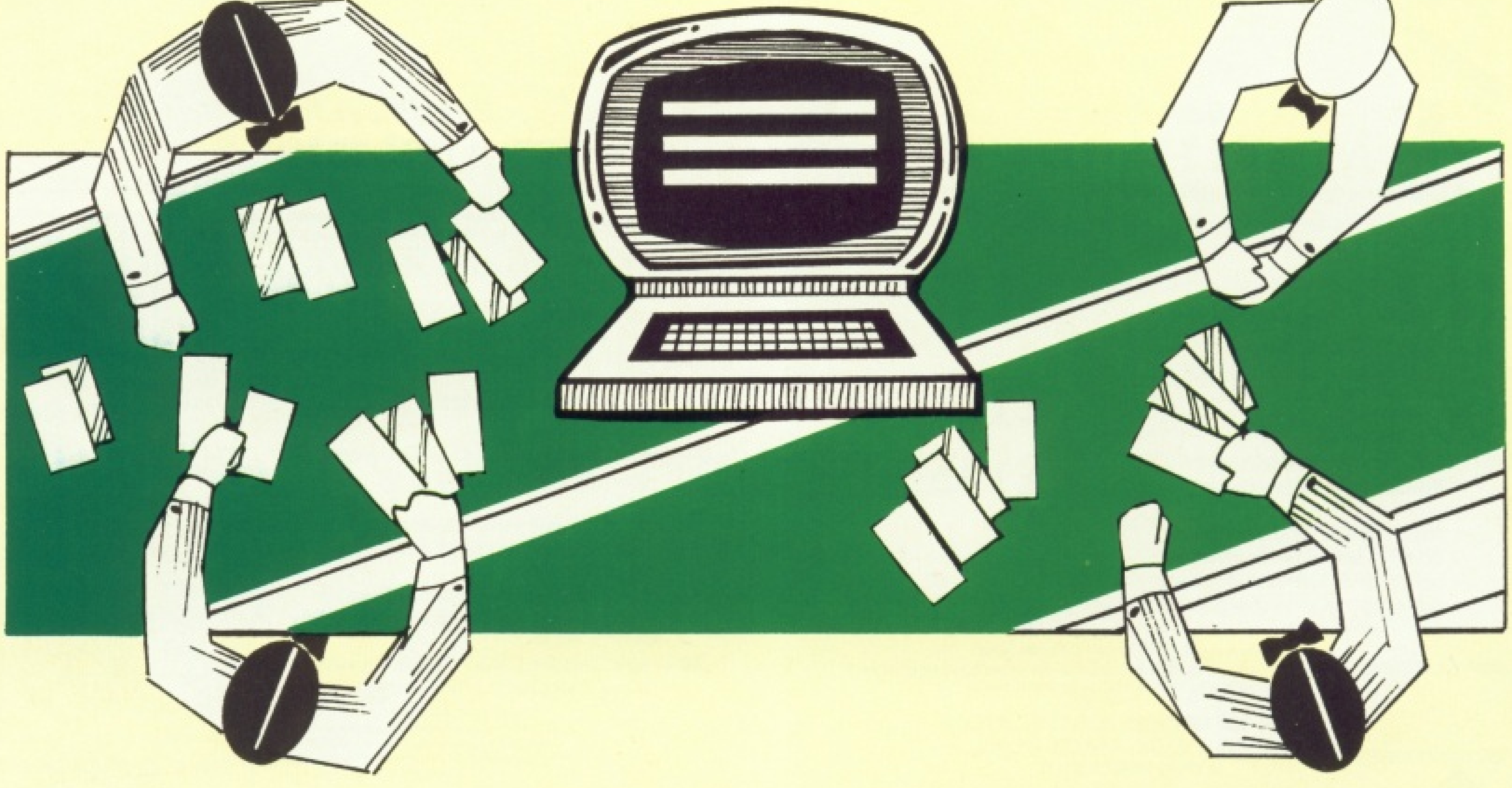
```
0 REM GRAPHICS FILE LOADER
1 REM By Mike Rowe
10 GRAPHICS 0:DIM F$(20)
20 ? :? :? "Enter Picture File":? "e.g
. D:PICTURE or C:"
30 INPUT F$
40 IF F$(1,2)<>"D:" AND F$(1,2)<>"C:"
THEN RUN
100 GRAPHICS 24:POKE 559,0
110 FOR X=1536 TO 1589:READ Y:POKE X,Y
:NEXT X
120 DATA 104,104,104,141,9,6,162,16,16
9,7,157,66,3,165,88,157,68,3,165,89,15
7,69,3,169,0
130 DATA 157,72,3,169,31,157,73,3,32,8
6,228,169,12,157,66,3,32,86,228,96,0,0
,0,0,0,0,0,0,0
140 DLIST=PEEK(560)+PEEK(561)*256
150 POKE DLIST+3,78
160 FOR I=DLIST+6 TO DLIST+198
170 IF PEEK(I)=15 THEN POKE I,14
180 IF PEEK(I)=79 THEN POKE I,78
190 NEXT I:POKE 559,34
200 CLOSE #1:OPEN #1,4,0,F$
210 Q=USR(1536,7)
220 CLOSE #1
300 GOTO 300
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
0	4954	1	3717	10	3886
20	11416	30	1659	40	7428
100	4109	110	7810	120	12924
130	12916	140	5460	150	3007
160	4788	170	4877	180	4945
190	3526	200	3950	210	2379
220	1559	300	1612		



TM
TM



BRIDGE

By JOHN HOOPER

THIS program allows you to bid and play contract-bridge against the computer. The standard of play is quite sophisticated so it uses storage-saving techniques to permit the program to run in 16k.

Select the card you wish to play with the joystick. Bidding is done by typing the particular bid you wish to make when it is your turn.

The game is in two parts – bidding and card-play. The computer randomly deals four hands. You play South and the computer bids and plays the other hands.

Bidding

The game follows the Nottingham club bidding convention which is described later. Bids are displayed at the top of the screen. Enter them by typing the bid, followed by Return. When it is your turn you are prompted with 'BID ?'. The bid format is a number, followed by the letter to indicate the suit.

For example, 1H for one heart, 3NT for three no-trumps, P for pass, and D for double. The computer will not accept bids in the wrong format and will prompt you again with 'BID ?'.

When bidding is finished, the computer asks you to type the identity of "declarer", which is 1 for North, 2 for East, 3 for South or 4 for West.

You are then asked to type the contract say, 2NT or 3H and so on. This allows you to play a hand that would otherwise be played by the computer, or permits you to set a more challenging contract. You will find this useful.

Card-play

Plug the joystick into port 1. The contract is displayed at the top left of the screen.

The first card is played by the hand to the left of the declarer. "Dummy's" hand is then displayed. When you are required to play a card, you will be prompted with a '?' and the cursor will be displayed.

Using the joystick, place the cursor over the card you wish to play and press the Fire button. The card will be played, and deleted from your hand. At the end of the trick the screen displays the winner and the trick total for each hand. To begin the next trick, press the Fire button.

Pressing the Fire button after trick 13 instigates a redeal and the bidding for the next game begins.

Pressing the Esc key at any point in the card play also instigates a redeal as soon as the next card is played.

- The display follows the normal format to be found in books, except that 'T' represents Ten.
- Each hand is separate, and should be bid to the highest contract feasible for that hand.
- There is no 'vulnerability'.
- Each deal is random and yields interesting distributions.

Playing hints

The computer plays either to achieve the contract, if it is declarer, or to defeat the contract if it is defence. It is not so concerned to get the maximum number of tricks.

It is capable of developing various long-term strategies – it can duck tricks, cross-trump, finesse, develop long suits and so on.

If you (South) are in defence, for example, the computer as your partner (North) will join with you in a sensible strategy, just as a human partner may do.

But the computer will not recognise the convention "lead the fourth highest of longest suit" in "no-trump" contracts. Also, if you hold KQ or QJ etc and you are in defence, lead the higher of the pair, or the computer will

assume that the opposition holds the higher card.

Bidding convention

Points are counted as ACE (4), KING (3), QUEEN (2) and JACK (1). This is a simple convention to use without many of the more complex – and to my mind obtuse – ingredients which impoverish the less than brilliant player's game. I have set limits for the computer which make it competitive and seemingly able to take risks.

Opening bids. The following are permissible:

1C (one club)	16-20 points. Partner is required to respond.
1D, 1H, 1S	12-15 points, with a five-card suit in the bid suit.
1NT	12-15 points, but with no five-card suit.
2C	12-15 points, with clubs as the five-card suit.
2D, 2H, 2S	20+ points, with a five-card suit in the bid suit.
2NT	20+ points without a five-card suit. Partner should respond.
3C, 3D, 3H, 3S	Pre-empt. Between 8-11 points, with at least seven cards in the bid suit.

Note that any other opening bid will not be understood by the computer. I would not like to predict its response.

Responses. The following describes the normal responding bids to the above.

After 1C

- Less than 7 points – Respond 1D.
- Between 7-11 points – 1NT, or 1 'something' in a good suit.
- Between 12-15 points – Jump response to 2 'something'. If you have a five-card suit, the 'something' should be that suit, otherwise NT.
- More than 15 points – Jump to 3 'something'.
- After 1D, 1H, 1S, 1NT, 2C

Responses are natural here, that is, more or less what you would expect. The responding bid lets partner know your points and distribution. So if you have a poor hand, but with some support for partner's suit, then rebid his suit at the next level, for example, 1D-2D.

If you have a good hand, perhaps an opening bid in your own right, then jump respond, showing your points as well as your strong suit. (For example 1D-2S, – jumping past 1S). You have to use your sense here, because there are many variations.

Another example. Suppose the opening bid was 1NT. You have a poor hand but a five-card suit. So respond with 2 in that suit – say, 1NT-2S.

Your partner will probably not bid further, because this is assumed to be a limiting-bid.

If you have a very strong hand, then jump to the level you think best describes that – but if you bid too high you may not leave room for "slam" bidding.

After 2D, 2H, 2S, 2NT

If partner has bid this, he has a very strong hand. The chances are that you will have a weak hand, but of course you must respond.

If you have a poor hand, merely support your partner by bidding the next bid up, say, 2D-2H.

If you hold 6 points or more, bid your best suit at a higher level, such as 2D-3H. Other variations are possible.

After 3C, 3D, 3H, 3S pre-empts

The computer has quite a complex function to respond to your pre-empt, but how do you respond to it? In general, a pre-empt means "not many points, but one strong suit".

Therefore you are wise not to change suits unless your hand is exceptionally strong in another suit. Another consideration is that if you hold 11 points or less the opposition will probably hold the majority of the points.

You are probably best to bid "P" (pass) in that case. Otherwise, bid higher in your partners suit, say, 3D-4D.

Bidding to slam. This can be tricky (pardon the pun). If you wish to bid to slam (6 or 6 'something'), signal this by bidding '4C'. The computer will probably assume you are asking for aces, and will respond:

4D-0 aces
4H-1 ace
4S-2 aces
4NT-3 aces
5C-4 aces

You should next ask for kings. Do this by bidding the next available bid. For example, if the computer has responded 4S, you return 4NT. The computer will tell you how many kings it has by bidding like this:

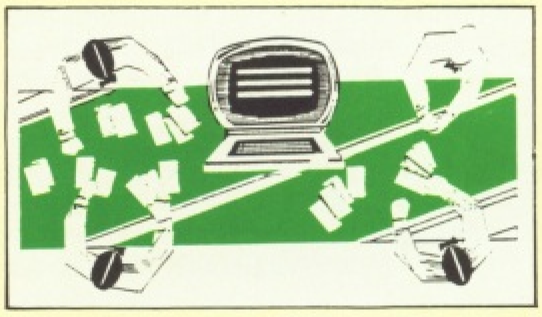
- Next available bid,–0 kings
- Next available bid+1,–1 king
- Next available bid+2,–2 kings,

and so on.

For example, if you had asked for kings by bidding 4NT (as above), the computer will bid 5H if it holds 2 kings.

Armed with knowledge of top cards, you can then make your final bid.

The problem comes when the computer bids 4C. Does this mean it



is asking you for aces? You have to infer this from the pattern of the previous bidding.

Bidding after opening-bid and response. The object is to bid the best possible suit, or NT if a good fit cannot be found, at the highest level that you think the cards can be played.

Generally, after opening-bid and response, you should have a good idea of point counts and distribution, and you should bid naturally for best effect.

Interference and competitive bidding. The same rules apply as before, except that you may not be in a position to give a clear, unambiguous description of your hand.

Doubling. The computer thinks of 'double' as an indication of strength. It will not double for penalty points.



PROGRAM DESCRIPTION

6-17	Define variables, arrays.
20-500	Random deal into array C(4,13). i.e. 4 hands with 13 cards.
900-1060	Subroutines for screen displays. Note the symbols for the suits. Also, on the first run through, CON=0, therefore only South's hand is displayed. After CON has been set to 1, other hands can be displayed.
2000-2310	Subroutine to evaluate hand strength. Each card is read in line 2010, and suit lengths (SU) and points (P) are calculated.
2500-2620	Subroutines for bidding display, plus analysis of South's bid B$. Each time a bid is made, a value is assigned to BD(n), and n is incremented. For example, if the opening bid is 'Pass', BD(1) is set to 50, and n increases to 2.
3000-4650	Main bidding control. Variable Y is used to monitor the state of the bidding, so as to pass control to the rest of the program when bidding has finished. Z is either 1 or 2, with 1 being assigned to North and South, and 2 to East-West. This allows the total strength of either partnership to be estimated, and maximum values to be given to limit the bidding -MAX(Z). This effectively determines the contract.
6000-7030	Responding bid control. The value previously given to BD(n) is now seen to be of use. BD(n-2) is the strength of your partner's last bid. BD(n-1) is the strength of the opponent's intervening bid.
5000-5130	Card-play control. This uses some of the variables used in the bidding to save storage. This section monitors the play, deciding whose turn it is, what cards are permissible, which suit is trumps, who has won the trick, and so on.
5900-5980	Crude subroutines to select either the highest or lowest card.
8000-8160	Joystick routine. 8105 gets the card. The suit is given by the value of Q, which is dependent on the cursor row position.
8300-8590	Display routines for card-play.
7500-7880 and 8600-9995	Play routines. These decide which card should be played, and which strategy should be adopted. At each trick, the program looks at how many tricks are needed to achieve or defeat the contract. If there is a simple strategy, it will use it. If not, the strategy will depend on whether or not the contract is in "no-trumps", or how many trumps are outstanding, or how many tricks are left to play, and so on.

```
1 REM ************************
2 REM ***     BRIDGE      ***
3 REM *** by John Hooper ***
4 REM ************************
6 OPEN #6,12,0,"S:":POKE 710,196:POKE
752,1
10 K0=0:K1=1:K2=K1+K1:K3=K2+K1:K4=K3+K
1:K5=K4+K1:K6=K5+K1:K7=K6+K1:K8=K7+K1:
K10=K2+K8:K11=K10+K1:K12=K11+K1
11 K13=K12+K1:K14=K13+K1:K16=K2+K14:K2
0=K5*K4:K30=K10*K3:K40=K4*K10:K50=K5*K
10
14 DIM C$(53),C(K4,K13),AN$(K5),SU(K4)
,P(K5),B$(K5),BID(K4),BD(25),MAX(K4),S
Y(K2),BL(K2),TOPS(K4,K2),TOPL(K2)
15 C1=K0:C2=K0:C3=K0:C4=K0:L=K1:FOR S=
K1 TO K4:BID(S)=K0:NEXT S:N=K1:MBID=K0
16 C$="23456789TJQKA23456789TJQKA23456
789TJQKA23456789TJQKA█":L1=4500:L2=590
0:L3=4600:L4=4040:L7=7000
17 MAX(K1)=K5*K7:MAX(K2)=K5*K7:BL(K1)=
K0:BL(K2)=K0:SY(K1)=K0:SY(K2)=K0:CON=K
0
20 FOR X=K50+K2 TO K1 STEP -K1:K=INT(R
ND(1)*K4+K1):ON K GOTO K50*K2,K50*K4,K
50*K6,K50*K8
100 IF C1=K13 THEN 200
120 C1=C1+K1:C(K1,C1)=X:GOTO K50*K10
200 IF C2=K13 THEN 300
220 C2=C2+K1:C(K2,C2)=X:GOTO K50*K10
300 IF C3=K13 THEN 400
320 C3=C3+K1:C(K3,C3)=X:GOTO K50*K10
400 IF C4=K13 THEN 100
420 C4=C4+K1:C(K4,C4)=X
500 NEXT X
900 A=K20:B=K20-K1:H=K3:POSITION A,B:?
 "S":GOSUB 1000:IF CON=K1 THEN RETURN
910 GOTO 2500
950 A=K20:B=K2:H=K1:POSITION A,B:? "N"
:GOSUB 1000:RETURN
960 A=K30:B=K8:H=K2:POSITION A,B:? "E"
:GOSUB 1000:RETURN
970 A=K10:B=K8:H=K4:POSITION A,B:? "W"
:GOSUB 1000:RETURN
1000 POSITION A-K4,B+K1:? CHR$(123);:K
=K4
1010 FOR X=K1 TO K13:IF INT((C(H,X)-K1
)/K13)+K1=K THEN ? C$(C(H,X),C(H,X));
1020 NEXT X
1025 ON K GOTO 1060,1050,1040,1030
1030 POSITION A-K4,B+K2:? CHR$(K0);:K=
K3:GOTO 1010
1040 POSITION A-K4,B+K3:? CHR$(96);:K=
K2:GOTO 1010
1050 POSITION A-K4,B+K4:? CHR$(K16);:K
=K1:GOTO 1010
1060 RETURN
2000 IF CON=K0 OR COUNT<>K1 THEN COUNT
=K0:P=K0:FOR S=K1 TO K4:SU(S)=K0:P(S)=
K0:NEXT S
2010 FOR X=K1 TO K13:K=INT((C(H,X)-K1)
/K13)+K1:SU(K)=SU(K)+K1:IF C(H,X)>K13*
K-K4 THEN P(K)=P(K)+C(H,X)-(K13*K-K4)
2020 NEXT X:IF CON=K1 THEN COUNT=COUNT
+K1:RETURN
2030 P=P(K1)+P(K2)+P(K3)+P(K4)
2250 S=K4:FOR T=K3 TO K1 STEP -K1
```

```
2260 IF SU(S)>=SU(T) THEN 2280
2270 S=S-K1:GOTO 2260
2280 NEXT T
2290 SU(K0)=S:IF SU(SU(K0))>K4 THEN SU
=SU(K0):GOTO 2310
2300 SU=K5
2310 RETURN
2500 POSITION K2,K0:? "N","E","S","W":
H=INT(RND(K0)*K4+K1):IF H<>K3 THEN 300
0
2530 TRAP 2530:POSITION K16,K10:? "BID
";:INPUT B$:POSITION K16,K10:? "
  ":IF N<K3 OR N>K6 THEN 2535
2532 IF BID(K1)=K2 THEN MAX(K1)=P:GOTO
 2535
2533 MAX(K1)=P:H=K1:GOSUB 2000
2534 MAX(K1)=MAX(K1)+P-K5:H=K3
2535 IF B$(K1,K1)="P" THEN BD(N)=K50:G
OTO L3
2540 IF B$(K1,K1)="D" THEN BD(N)=K40:G
OTO L3
2550 BD(N)=(VAL(B$(K1,K1))-K1)*K5
2560 IF B$(K2,K2)="C" THEN BD(N)=BD(N)
+K1
2570 IF B$(K2,K2)="D" THEN BD(N)=BD(N)
+K2
2580 IF B$(K2,K2)="H" THEN BD(N)=BD(N)
+K3
2590 IF B$(K2,K2)="S" THEN BD(N)=BD(N)
+K4
2600 IF B$(K2,K2)="N" THEN BD(N)=BD(N)
+K5
2601 IF N<K5 THEN GOTO L3
2602 IF BL(K1)<>K0 THEN BL(K1)=BL(K1)+
K1
2603 IF BD(N)=K16 THEN BL(K1)=K2
2604 IF BD(N-K2)=K16+K1+CA THEN BL(K1)
=K4
2606 IF BD(N-K2)=K16+K2+CA+CK THEN BL(
K1)=K6
2610 GOTO L3
3000 Y=K0:FOR S=K1 TO K4:Y=Y+BID(S):NE
XT S:IF Y=K16 AND BID(H)=K10 THEN 5000
3010 IF Y=K8 THEN RUN
3020 GOSUB 2000
3030 IF H=K3 THEN 2530
3040 IF Y<K8 THEN 4000
3050 Z=K2*INT(H/K2)+K2-H:IF BD(N-K2)<K
40 THEN PR=K5*INT((BD(N-K2)-K1)/K5)
3055 PR=K5*INT((MBID-K1)/K5)
3060 IF Y=K10 THEN 6000
3070 IF Y=K12 OR Y=K14 OR Y=K20 THEN 6
100
3080 IF Y=K16 AND N=K5 OR N=K6 THEN 61
00
3090 IF Y=K16 THEN GOTO L4
3100 IF Y=K20+K2 OR Y=K30 AND BD(N-K2)
<>K40 THEN 6100
3110 IF Y=K20+K2 OR Y=K30 THEN 6300
3120 IF Y=K12*K2 AND N=K5 AND BD(N-K4)
=K50 THEN 6100
3130 ON BL(Z)+K1 GOTO 3140,3180,3190,3
200,3210,3220,4040
3140 IF MBID>MAX(Z) THEN GOTO L4
3150 IF SY(Z)=K0 THEN GOSUB 6800
3160 IF MAX(Z)>=K30 THEN 3180
3170 BD(N)=PR+SY(Z):GOTO L7
3180 BD(N)=K16:BL(Z)=K2:GOTO L7
3190 CA=K0:FOR X=K1 TO K13:IF INT(C(H,
X)/K13)=C(H,X)/K13 THEN CA=CA+K1
3194 NEXT X
3196 BD(N)=MBID+K1+CA:BL(Z)=K3:GOTO L7
3200 BD(N)=MBID+K1:BL(Z)=K4:GOTO L7
3210 CK=K0:FOR X=K1 TO K13:IF INT(C(H,
X)/K12)=C(H,X)/K12 THEN CK=CK+K1
3214 NEXT X
3216 BD(N)=MBID+K1+CK:BL(Z)=K5:GOTO L7
3220 FOR X=K1 TO K13:IF INT(C(H,X)/K13
)=C(H,X)/K13 THEN CA=CA+K1
3225 NEXT X
3230 FOR X=K1 TO K13:IF C(H,X)/K12=INT
(C(H,X)/K12) THEN CK=CK+K1
3235 NEXT X
3240 PR=K7*K5-K5*(K4-CA)-K5*INT((K4-CK
)/K2)
3250 BD(N)=SY(Z)+PR-K5:BL(Z)=K6:GOTO L
7
4000 IF P>K20 THEN 4100
4010 IF P>K3*K5 THEN 4130
4020 IF P>K11 THE" 4200
4030 IF P>K8 THEN 4300
4040 BD(N)=K50:B$="PASS":GOTO L3
4045 BD(N)=K40:B$="DBL":GOTO L3
4100 IF SU(SU(K0))>K4 THEN 4120
4110 BD(N)=K10:GOTO L1
4120 ON SU(K0) GOTO 4130,4140,4150,416
0
4130 BD(N)=K1:GOTO L1
4140 BD(N)=K7:GOTO L1
4150 BD(N)=K8:GOTO L1
4160 BD(N)=K10-K1:GOTO L1
4200 IF SU(SU(K0))>K4 THEN 4220
4210 BD(N)=K5:GOTO L1
4220 ON SU(K0) GOTO 4230,4240,4250,426
0
4230 BD(N)=K6:GOTO L1
4240 BD(N)=K2:GOTO L1
4250 BD(N)=K3:GOTO L1
4260 BD(N)=K4:GOTO L1
4300 IF SU(SU(K0))<K7 THEN GOTO L4
4310 ON SU(K0) GOTO 4320,4330,4340,435
0
4320 BD(N)=K11:GOTO L1
4330 BD(N)=K12:GOTO L1
4340 BD(N)=K13:GOTO L1
4350 BD(N)=K14:GOTO L1
4500 B$=STR$(INT((BD(N)-K1)/K5)+K1)
4510 ON BD(N)-K5*INT((BD(N)-K1)/K5) GO
TO 4520,4530,4540,4550,4560
4520 B$(LEN(B$)+K1)="C":GOTO L3
4530 B$(LEN(B$)+K1)="D":GOTO L3
4540 B$(LEN(B$)+K1)="H":GOTO L3
4550 B$(LEN(B$)+K1)="S":GOTO L3
4560 B$(LEN(B$)+K1)="NT":GOTO L3
4600 IF B$(K1,K1)="P" THEN BID(H)=K2:G
OTO 4620
4610 BID(H)=K10
4620 POSITION (H-K1)*K10+K2,L:? B$:IF
BD(N)<K40 THEN MBID=BD(N)
4630 H=H+K1:IF H=K5 THEN H=K1:L=L+K1
4640 N=N+K1
4650 GOTO 3000
4900 ? CHR$(K16);:RETURN
4910 ? CHR$(96);:RETURN
4920 ? CHR$(K0);:RETURN
4930 ? CHR$(123);:RETURN
5000 TRAP 5000:CON=K1:TR=K1:POSITION K
0,K10:? "DECLARER ?...1(N),2(E),3(S),O
R 4(W)   ";"←";"←";"←";:INPUT DEC
5010 POSITION K0,K12:? "CONTRACT IS
";"←";"←";"←";:INPUT AN$:IF AN$(K2.K2)
="C" THEN TRUMP=K1
5012 IF AN$(K2,K2)="D" THEN TRUMP=K2
5014 IF AN$(K2,K2)="H" THEN TRUMP=K3
5016 IF AN$(K2,K2)="S" THEN TRUMP=K4
5020 V=VAL(AN$(K1,K1)):DUM=DEC+K2:IF D
UM>K4 THEN DUM=DUM-K4
5030 ? CHR$(125):GOSUB 900:POSITION K0
,K0:? AN$
5040 C6=K0:HIGH=K0:FOR H=K1 TO K4:MAX(
H)=K0:NEXT H:H=DEC+K1:PLAY=K1:EW=K0:NS
=K0:IF H>K4 THEN H=K1
5050 C2=K0:GOSUB 8300:IF TR=K14 THEN R
UN
5052 IF PEEK(764)=28 THEN RUN
5055 IF TR=K1 AND PLAY=K2 THEN ON H GO
SUB 950,960,900,970
5060 Z=K2*INT(H/K2)+K2-H:IF H=K3 AND D
UM<>K3 OR (H=K1 AND H=DUM) THEN GOSUB
8000:GOTO 5080
5070 GOSUB 8600
5080 GOSUB 8300:ON INT((C(H,X1)-K1)/K1
3)+K1 GOSUB 4900,4910,4920,4930
5082 IF PLAY=K1 THEN SUPL=INT((C(H,X1)
-K1)/K13)+1
5085 BID(PLAY)=C(H,X1):IF C2=K0 AND C6
=K0 AND C(H,X1)>HIGH THEN HIGH=C(H,X1)
:MAX=Z:MIN=H
5090 ? C$(C(H,X1),C(H,X1)):C$(C(H,X1),
C(H,X1))=" ":IF H=K3 AND H<>DUM THEN G
OSUB 900
5095 IF H<>DUM THEN 5100
5096 ON DUM GOSUB 950,960,900,970
5100 PLAY=PLAY+K1:H=H+K1:IF PLAY=K5 TH
EN PLAY=K1:TR=TR+K1:GOSUB 8500:H=MIN:T
OPL(K1)=K0:TOPL(K2)=K0:HIGH=K0:C6=K0
5120 IF H=K5 THEN H=K1
5130 GOTO 5050
5900 X=K13
5910 C=C(H,X):IF C$(C,C)=" " THEN 5930
5920 IF C>K13*SUPL-K13 AND C<=K13*SUPL
 THEN X1=X:RETURN
5930 X=X-K1:IF X=K0 THEN RETURN
5940 GOTO 5910
5950 X=K1
5960 C=C(H,X):IF C$(C,C)=" " THEN 5980
5970 IF C>K13*SUPL-K13 AND C<=K13*SUPL
 THEN X1=X:RETURN
5980 X=X+K1:GOTO 5960
6000 IF P<K13 THEN GOTO L4
6010 IF P>15 THEN 4045
6020 IF MBID>K6 THEN GOTO L4
6030 BD(N)=SU:GOTO L7
6100 IF BD(N-K2)=K50 THEN MAX(Z)=P:GOT
O 6000
6110 IF BD(N-K2)=K1 THEN 6300
6120 IF BD(N-K2)<K7 THEN 6400
6130 IF BD(N-K2)<K11 THEN 6500
6200 MAX(Z)=BD(N-K2)+P/K2+INT(SU(SU(K0
```

```
))/K3)
6210 BD(N)=BD(N-K2)+K5:GOTO L7
6300 IF P<K7 THEN MAX(Z)=K10:IF Y>K16
THEN GOTO L4
6305 IF P<K7 THEN BD(N)=K2:GOTO L1
6310 IF P<K12 THEN MAX(Z)=K20:BD(N)=K5
:GOTO L7
6320 IF P<K16 THEN MAX(Z)=K30-(Z-K1)*K
5:BD(N)=K5+SU:GOTO L7
6330 BD(N)=K10+SU:GOTO L7
6400 ON P/K6+K1 GOTO 6410,6420,6440,64
50,6450
6410 MAX(Z)=K10:IF SU<K5 AND BD(N-K2)=
K5 THEN BD(N)=SU+K5:GOTO L7
6415 GOTO L4
6420 MAX(Z)=P+SU(SU(0))/K2:BD(N)=PR+SU
:GOTO L7
6440 MAX(Z)=25-(Z-K1)*K5:BD(N)=K5+SU+P
R:GOTO L7
6450 BD(N)=K10+SU+PR:GOTO L7
6500 MAX(Z)=K13+P+INT(SU(SU(K0))/K2):I
F MAX(Z)>35 THEN MAX(Z)=35
6510 IF P<K6 THEN BD(N)=BD(N-K2)+K1:GO
TO L7
6520 BD(N)=K5+SU:GOTO L7
6800 CHANGE=K2:IF SU=BD(N-K2)-PR THEN
SY(Z)=SU:RETURN
6810 SY(Z)=SU:P(SU(K0))=BEST:SU(SU(K0)
)=LENGTH:IF H<K3 THEN H=H+K2:CHANGE=-K
2:GOTO 6840
6830 H=H-K2
6840 GOSUB 2000
6850 H=H+CHANGE:IF SY(Z)=K5 AND SU<>K5
 THEN SY(Z)=SU:RETURN
6860 IF SY(Z)=K5 THEN RETURN
6870 IF SU=K5 THEN RETURN
6880 IF P(SU)>BEST OR SU(SU(K0))>LENGT
H THEN SY(Z)=SU:GOTO 6892
6890 RETURN
6892 GOSUB 2000:IF SU(SY(Z))<K3 AND SU
(SU(K0))>K5 THEN SY(Z)=SU
6894 IF SU(SY(Z))<K3 THEN SY(Z)=K5:MAX
(Z)=MAX(Z)-K5
6896 RETURN
7000 IF BD(N)>MAX(Z) AND BL(Z)=K0 THEN
 GOTO L4
7010 IF BD(N)<=MBID AND MAX(Z)>=BD(N)+
K5 THEN BD(N)=BD(N)+K5
7020 IF BD(N)>MBID THEN GOTO L1
7030 GOTO L4
7500 IF TR>9 AND TOP>K0 THEN 9100
7510 IF TRUMP<>K0 THEN 7700
7520 IF MAX(Z)=K0 THEN GOSUB 7560
7530 CPL=MAX(Z):GOSUB 9700:IF X=K0 AND
 TOP>K0 THEN GOSUB 9400:GOTO 7550
7535 IF X=K0 THEN 8800
7540 IF TOPS(CPL,K1)>K0 OR TOPS(CPL,K2
)>K0 THEN SUPL=CPL:GOTO 8765
7545 SUPL=CPL:GOTO L2
7550 IF TOPS(S,K1)+TOPS(S,K2)>K1 AND T
OPS(S,K2)>K0 THEN SUPL=S:GOTO L2
7552 IF TOPS(S,K1)+TOPS(S,K2)>K1 THEN
SUPL=S:GOTO 8765
7555 GOTO 8800
7560 COUNT=K0:GOSUB 2000:D=K2:IF H>K2
THEN D=-K2
7570 H=H+D:GOSUB 2000:COUNT=K0:H=H-D:S
=K4:FOR T=K3 TO K1 STEP -K1
7580 IF SU(S)>=SU(T) THEN 7600
7590 S=S-K1:GOTO 7580
7600 NEXT T:SU(K0)=S:IF S=K1 THEN 7630
7610 FOR T=S-K1 TO K1 STEP -K1:IF SU(S
U(K0))=SU(T) AND P(SU(K0))<P(T) THEN S
U(K0)=T
7620 NEXT T
7630 MAX(Z)=SU(K0):RETURN
7700 IF MAX(H)=K0 THEN GOSUB 7800:IF M
AX(H)=K0 THEN 8800
7710 CPL=MAX(H):GOSUB 9700:IF X=K0 THE
N 8800
7720 IF TOPS(CPL,K1)>K0 OR TOPS(CPL,K2
)>K0 THEN SUPL=CPL:GOTO 8765
7730 D=K2:IF H>K2 THEN D=-K2
7740 H=H+D:CPL=TRUMP:GOSUB 9700:H=H-D:
CPL=MAX(H):IF X=K0 THEN 8800
7750 SUPL=CPL:GOTO L2
7800 COUNT=K0:D=K2:IF H>K2 THEN D=-K2
7810 H=H+D:GOSUB 2000:H=H-D:S=K4:COUNT
=K0
7820 IF SU(S)=COUNT THEN 7850
7830 S=S-K1:IF S=K0 THEN 7870
7840 GOTO 7820
7850 IF S<>TRUMP THEN MAX(H)=S:COUNT=K
0:RETURN
7860 GOTO 7830
7870 COUNT=COUNT+K1:IF COUNT=K3 THEN C
OUNT=K0:RETURN
7880 S=K4:GOTO 7820
8000 POKE 752,K0:POSITION A,B:? "♠";:F
SUPL=K0:IF PLAY<>K1 THEN CPL=SUPL:GOSU
B 9700:IF X<>K0 THEN FSUPL=K1
```




```
8010 POKE 77,K0:ST=STICK(K0):FOR Q=K1
TO 15:NEXT Q
8020 IF ST=K14 THEN ? "↑";
8030 IF ST=K7 THEN ? "→";
8040 IF ST=K13 THEN ? "↓";
8050 IF ST=K11 THEN ? "←";
8060 IF STRIG(K0)<>K0 THEN 8010
8070 Q1=PEEK(84):IF Q1=K3 OR Q1=9 OR Q
1=K20 THEN Q2=K40:Q3=52
8080 IF Q1=K4 OR Q1=K10 OR Q1=21 THEN
Q2=27:Q3=39
8090 IF Q1=K5 OR Q1=K11 OR Q1=22 THEN
Q2=K14:Q3=26
8100 IF Q1=K6 OR Q1=K12 OR Q1=23 THEN
Q2=K1:Q3=K13
8105 GET #K6,CARD
8106 IF CARD=160 OR CARD=128 OR CARD=1
44 OR CARD=224 OR CARD=251 OR CARD=206
 OR CARD=211 THEN ? CHR$(253):GOTO 800
0
8110 FOR X=K1 TO K13:IF C$(C(H,X),C(H,
X))=CHR$(CARD-128) AND Q3>=C(H,X) AND
C(H,X)>=Q2 THEN X1=X
8115 IF FSUPL=K1 AND INT((Q3-K1)/K13)+
K1<>SUPL THEN ? CHR$(253):GOTO 8000
8120 NEXT X:POKE 752,K1:C=C(H,X1):IF P
LAY=K1 OR (C>K13*SUPL-K13 AND C<=K13*S
UPL) THEN RETURN
8130 C2=K1:IF TRUMP<>K0 AND C>K13*TRUM
P-K13 AND C<=K13*TRUMP THEN C6=K1:GOTO
 8150
8140 RETURN
8150 GOSUB 9500:IF C3=K1 THEN 8170
8160 IF C<BID(C3-K1) THEN RETURN
8170 MAX=Z:WIN=H:RETURN
8300 A=26-K2*H-K4*INT((K5-H)/K4):B=K8+
K2*H-K4*INT(H/K4):POSITION A,B:RETURN
8500 POSITION K6,K0:? "WINNER IS ";:ON
 WIN GOSUB 8560,8570,8580,8590:IF WIN=
K1 OR WIN=K3 THEN 8520
8510 EW=EW+K1:GOTO 8530
8520 NS=NS+K1
8530 POSITION K0,K1:? "N/S";NS:? "E/W"
;EW
8535 IF STRIG(K0)<>K0 THEN 8535
8540 FOR H=K1 TO K4:GOSUB 8300:? "  ";:
NEXT H
8550 RETURN
8560 ? "NORTH":RETURN
8570 ? "EAST ":RETURN
8580 ? "SOUTH":RETURN
8590 ? "WEST ":RETURN
8600 GOSUB 9000:IF PLAY=K1 THEN HIGH=K
0:MAX=K0:GOTO 8750
8610 CPL=SUPL:GOSUB 9700:IF X<>K0 THEN
 8620
8614 C2=K1:GOTO 9800
8620 IF SUPL<>TRUMP AND TRUMP<>K0 THEN
 GOSUB 9500:IF C3<>K1 THEN GOTO L2
8630 IF TOPL(K1)=K1 OR TOPL(K2)=K1 THE
N GOTO L2
8640 IF PLAY=K2 THEN 8720
8650 GOSUB 5950:IF C(H,X1)<HIGH OR (PL
AY=K3 AND H=K1 AND C(H,X1)=BID(PLAY-K2
)+K1) THEN GOTO L2
8660 IF PLAY=K4 AND MAX<>Z THEN X=K13:
GOTO 8950
8670 IF PLAY=K4 THEN GOTO L2
8680 GOSUB 5900:X3=X1
8690 IF C(H,X1)>HIGH THEN C1=C(H,X1):X
2=X1:GOTO 8900
8700 X3=X3-K1:X=X3:IF X=K0 THEN 5950
8705 GOSUB 5910:IF X=K0 THEN 5950
8710 GOTO 8690
8720 IF TOPS(SUPL,K2)>K0 OR TOPS(SUPL,
K1)=K0 THEN GOTO L2
8725 IF TRUMP=K0 AND TR<K3 AND PLAY<>K
3 THEN GOSUB 9350:IF TOP<NEED THEN GOT
O L2
8730 IF TOPS(SUPL,K1)>K0 THEN GOSUB 59
50:IF C(H,X1)>BID(PLAY-K1) THEN TOPL(Z
)=K1:RETURN
8740 GOTO L2
8750 IF TOP=K0 THEN 7500
8755 GOSUB 9350:IF TOP>=NEED THEN 9100
8757 GOTO 7500
8760 GOSUB 9400:SUPL=S:IF TRUMP=K0 AND
 MAX(Z)<>K0 AND S<>MAX(Z) THEN GOSUB 8
850
8765 IF (TOPS(SUPL,K1)<=TOPS(SUPL,K2)
AND TOPS(SUPL,K1)>K0) OR TOPS(SUPL,K2)
=K0 THEN TOPL(Z)=K1:GOTO 5950
8770 CPL=SUPL:GOSUB 9700:IF X<>K0 THEN
 GOTO L2
8800 IF TOP>K1 THEN GOSUB 9400:SUPL=S
8810 IF SUPL<>TRUMP THEN 8820
8815 SUPL=INT(RND(0)*K4+K1):IF SUPL=TR
UMP THEN SUPL=INT(RND(0)*K4+K1)
```

```
8820 CPL=SUPL:GOSUB 9700:IF X=K0 THEN
8815
8830 X1=X:RETURN
8850 MAX(Z)=CPL:GOSUB 9700:IF X=K0 THE
N RETURN
8860 IF TOPS(MAX(Z),K1)+TOPS(MAX(Z),K2
)>K0 THEN SUPL=MAX(Z):RETURN
8900 D=K1:H=H+D:IF H=K5 THEN H=K1:D=-K
3
8905 CPL=SUPL:GOSUB 9700:IF X=K0 THEN
H=H-D:X1=K2:RETURN
8910 GOSUB 5950:IF C1>C(H,X1) THEN H=H
-D:X1=K2:RETURN
8920 H=H-D:GOTO 8700
8950 GOSUB 5910
8960 IF C(H,X1)>HIGH THEN RETURN
8970 X=X-K1:IF X=K0 THEN GOTO L2
8980 GOTO 8950
9000 TOP=K0:FOR D=K1 TO K4:FOR MARK=K1
 TO K2:TOPS(D,MARK)=K0:NEXT MARK:NEXT
D:C=53:D=K2:MARK=K1:IF H>K2 THEN D=-K2
9010 C=C-K1:IF C<=K0 THEN RETURN
9020 IF MARK=K2 THEN MARK=K1:H=H-D
9030 IF C$(C,C)=" " THEN 9010
9040 X=K13
9050 IF X=K0 THEN ON MARK GOTO 9080,90
90
9060 IF C(H,X)=C THEN TOP=TOP+K1:TOPS(
INT((C-K1)/K13)+K1,MARK)=TOPS(INT((C-K
1)/K13)+K1,MARK)+K1:GOTO 9010
9070 X=X-K1:GOTO 9050
9080 H=H+D:MARK=K2:GOTO 9040
9090 H=H-D:MARK=K1:C=K13*INT((C-K1)/K1
3)+K1:GOTO 9010
9100 IF TRUMP=K0 THEN 8760
9110 CPL=TRUMP:GOSUB 9700:IF X=K0 THEN
 8760
9115 COUNT=K0:IF H=K4 THEN D=-K3:H=H+D
:GOTO 9130
9120 D=K1:H=H+D
9130 GOSUB 9700:H=H-D:IF X<>K0 THEN SU
PL=TRUMP:GOTO 9170
9140 COUNT=COUNT+K1:IF COUNT=K2 THEN C
OUNT=K0:GOTO 8760
9150 IF H=K1 THEN D=K3:H=H+D:GOTO 9130
9160 D=-K1:H=H+D:GOTO 9130
9170 IF TOPS(SUPL,K1)>K0 OR TOPS(SUPL,
K2)>K0 THEN 8765
9180 GOTO L2
9350 IF H=DUM OR H=DEC THEN NEED=K6+V:
GOTO 9370
9360 NEED=K8-V
9370 IF H=K1 OR H=K3 THEN NEED=NEED-NS
:GOTO 9390
9380 NEED=NEED-EW
9390 RETURN
9400 S=K4:FOR T=K3 TO K1 STEP -K1
9410 IF TOPS(S,K1)+TOPS(S,K2)>TOPS(T,K
1)+TOPS(T,K2) THEN 9430
9415 IF TOPS(S,K1)+TOPS(S,K2)=TOPS(T,K
1)+TOPS(T,K2) THEN 9440
9420 S=S-K1:IF S=K0 THEN S=T:POP :RETU
RN
9425 GOTO 9410
9430 NEXT T:RETURN
9440 IF TOPS(S,K1)>TOPS(T,K1) OR T=TRU
MP THEN 9430
9450 GOTO 9420
9500 C3=PLAY
9510 IF BID(C3-K1)>K13*TRUMP-K13 AND B
ID(C3-K1)<=K13*TRUMP THEN RETURN
9520 C3=C3-K1:IF C3=K1 THEN RETURN
9530 GOTO 9510
9700 X=K14
9710 X=X-K1:IF X=K0 THEN RETURN
9720 IF C$(C(H,X),C(H,X))=" " THEN 971
0
9730 IF C(H,X)>K13*CPL-K13 AND C(H,X)<
=K13*CPL THEN RETURN
9740 GOTO 9710
9800 IF SUPL=TRUMP OR TRUMP=K0 THEN 99
40
9810 CPL=TRUMP:GOSUB 9700:IF X=K0 THEN
 9940
9830 GOSUB 9500:IF C3=K1 THEN 9920
9840 IF C3<>PLAY THEN 9940
9850 X=K13
9860 C=C(H,X):IF C$(C,C)=" " THEN 9880
9870 IF C>K13*TRUMP-K13 AND C<=K13*TRU
MP THEN 9900
9880 X=X-K1:IF X=K0 THEN 9940
9890 GOTO 9860
9900 IF BID(PLAY-K1)>C THEN 9880
9910 X1=X:MIN=H:C6=K1:RETURN
9920 IF TOPL(Z)=K1 OR (PLAY=K4 AND MAX
=Z) THEN 9940
9930 C5=SUPL:SUPL=TRUMP:GOSUB 5900:SUP
L=C5:MIN=H:C6=K1:RETURN
9940 C5=K14:X1=K0:FOR CPL=K1 TO K4:X=K
14:IF CPL=TRUMP THEN 9990
9950 X=X-K1:IF X=K0 THEN 9990
9960 C=C(H,X):IF C$(C,C)=" " THEN 9950
9970 IF C>K13*CPL-K13 AND C<=K13*CPL A
ND C-K13*INT((C-K1)/K13)<C5 THEN C5=C
-K13*INT((C-K1)/K13):X1=X:GOTO 9990
9980 GOTO 9950
9990 NEXT CPL:IF X1<>K0 THEN RETURN
9995 GOTO 9930
```

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	3517	2	3791	3	5621
4	3517	6	6942	10	10808
11	13053	14	10190	15	13692
16	17581	17	13488	20	14816
100	3248	120	5726	200	3251
220	5736	300	3254	320	5746
400	3249	420	3528	500	1375
900	13680	910	1865	950	10350
960	10334	970	10398	1000	6597
1010	11894	1020	1375	1025	5001
1030	8414	1040	8387	1050	8464
1060	1498	2000	15576	2010	19007
2020	9258	2030	4200	2250	5211
2260	4691	2270	2902	2280	1367
2290	9707	2300	1125	2310	1498
2500	12496	2530	17591	2532	6783
2533	4757	2534	4741	2535	7015
2540	7002	2550	4783	2560	5998
2570	6001	2580	6007	2590	6020
2600	6017	2601	3793	2602	5936
2603	4625	2604	6358	2606	7285
2610	1479	3000	13287	3010	3207
3020	1928	3030	2909	3040	3007
3050	12310	3055	4429	3060	3064
3070	6427	3080	6321	3090	3739
3100	8475	3110	5467	3120	8341
3130	7958	3140	5440	3150	4947
3160	4507	3170	4327	3180	4821
3190	12294	3194	1375	3196	6415
3200	5710	3210	12397	3214	1375
3216	6437	3220	10457	3225	1375
3230	10773	3235	1375	3240	6655
3250	6681	4000	3023	4010	3623
4020	3026	4030	2967	4040	4936
4045	4455	4100	4544	4110	3241
4120	5864	4130	2923	4140	2947
4150	2951	4160	3712	4200	4549
4210	2939	4220	5876	4230	2943
4240	2927	4250	2931	4260	2935
4300	5522	4310	5872	4320	3246
4330	3251	4340	3256	4350	3261
4500	5148	4510	10170	4520	4245

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
4530	4248	4540	4260	4550	4293
4560	4728	4600	7026	4610	1705
4620	10420	4630	5846	4640	1071
4650	1852	4900	3898	4910	3632
4920	3674	4930	3796	5000	18181
5010	15886	5012	5569	5014	5579
5016	5603	5020	10214	5030	7520
5040	17388	5050	7021	5052	4713
5055	9290	5060	15578	5070	1970
5080	11097	5082	8433	5085	15368
5090	13720	5095	3788	5096	4803
5100	21091	5120	3084	5130	1876
5900	987	5910	5171	5920	9314
5930	5468	5940	1887	5950	936
5960	5186	5970	9314	5980	2969
6000	3681	6010	2926	6020	4613
6030	3103	6100	7604	6110	4450
6120	4480	6130	4442	6200	7382
6210	4535	6300	8391	6305	5507
6310	7426	6320	10023	6330	3840
6400	6790	6410	11158	6415	1482
6420	7717	6440	7913	6450	4516
6500	11229	6510	6998	6520	3756
6800	9572	6810	15837	6830	1047
6840	1928	6850	10615	6860	4778
6870	4006	6880	11600	6890	1498
6892	11200	6894	8633	6896	1498
7000	7521	7010	10144	7020	4600
7030	1482	7500	4986	7510	4085
7520	5096	7530	12690	7535	3007
7540	11493	7545	3315	7550	12430
7552	9518	7555	1886	7560	8129
7570	11650	7580	4682	7590	2939
7600	6160	7610	14692	7620	1367
7630	4197	7700	9029	7710	7640
7720	11493	7730	4201	7740	11731
7750	3315	7800	6068	7810	6896
7820	4870	7830	4700	7840	1892
7850	8590	7860	1896	7870	9984
7880	2859	8000	20151	8010	8649
8020	3582	8030	3231	8040	3582
8050	3577	8060	4619	8070	9878

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
8080	7731	8090	7829	8100	7911
8105	2168	8106	19820	8110	15900
8115	12320	8120	16712	8130	14111
8140	1498	8150	5474	8160	5268
8170	4211	8300	13404	8500	16490
8510	3368	8520	1661	8530	6444
8535	4656	8540	6962	8550	1498
8560	3257	8570	3040	8580	3288
8590	3134	8600	9763	8610	7149
8614	2875	8620	13094	8630	8201
8640	3835	8650	16413	8660	8128
8670	4671	8680	3048	8690	8703
8700	5761	8705	4965	8710	1916
8720	10364	8725	14730	8730	16381
8740	1476	8750	3713	8755	6049
8757	1875	8760	14440	8765	19294
8770	7776	8800	6505	8810	4999
8815	12796	8820	7043	8830	2563
8850	8379	8860	11912	8900	6110
8905	10207	8910	9327	8920	2824
8950	1978	8960	5508	8970	5446
8980	1909	9000	21299	9010	5480
9020	5854	9030	4050	9040	987
9050	6575	9060	18275	9070	2949
9080	4317	9090	8640	9100	3977
9110	7218	9115	8110	9120	1852
9130	10304	9140	10227	9150	6003
9160	3881	9170	9681	9180	1476
9350	7862	9360	2000	9370	8273
9380	2495	9390	1498	9400	5211
9410	10562	9415	10562	9420	7197
9425	1880	9430	3186	9440	8663
9450	1884	9500	1436	9510	11941
9520	5712	9530	1883	9700	988
9710	5468	9720	5807	9730	9964
9740	1889	9800	7060	9810	7217
9830	5480	9840	3925	9850	987
9860	5188	9870	8326	9880	4735
9890	1912	9900	4881	9910	5009
9920	8695	9930	11840	9940	10801
9950	4755	9960	5181	9970	18989
9980	1911	9990	6105	9995	1903

Of worms that turn not up, and a nasty line in operatic phantoms

ONCE again printing deadlines have defeated my good intentions. I promised last month to review Worm in Paradise and although the game is probably, as you read this, the best selling adventure out for the Atari, unfortunately I have yet to receive a copy to review.

Never mind, as a special treat for Level 9 fans I intend to do a feature on the full trilogy. So next month prepare to enter the silicon dream world of Level 9.

I have, however, been able to keep the other half of my promise and review Asylum from Screenplay, not a company I have come across before. This is a translation of the original from the TRS 80 (the what?) and Apple.

First of all, let me explain that the Asylum in question is designed for the likes of you and I (and not before time for some of us) where adventurers are sent to recuperate and at the same time try to escape to the real world.

You are not alone in this enterprise as behind the multitude of doors in this complicated maze structure lurk your fellow inmates, all eager to assist or obstruct or just plain irritate.

The game is a graphic adventure, and the graphics vary between the simple but effective grey walls of the maze to the cartoon-like features of the other loonies entrapped.

Movement is in two forms, either via the cursor keys to manoeuvre around the extremely complicated maze, or by the more traditional text parser for opening doors and collecting objects.

The game has a good authentic feel as you plunge around the corridors. You can barter with or ignore your fellow prisoners.

It also has some interesting and

By Brillig

useful additions to the normal adventure game. You can list out the vocabulary to see if you are barking up the wrong tree, and the availability of an abbreviation single keystroke for commands such as lock and unlock save many a nasty case of typist's finger.

Finally, there is a slide show feature which allows you to witness screens from the game, although this will not be of too much assistance in solving the game.

Overall this is the most playable graphic adventure I have yet come across, and at £9.95 represents very good value.

Also in the very good value stakes



is Opera House, from Bignose Software, a spooky tale of an aspiring Pavarotti who finds that the theatre of his dreams lies derelict under the curse of The Phantom.

In order to avoid the ignominious return to the chorus line the hero has to banish the Phantom from the theatre, a tough task as he turns out to be an elusive chap with a tendency towards clobbering you over the head if you let your guard drop for a moment.

The style of the game is verb/noun with a screen layout in the image of the early Scott Adams adventures. Progress around the locations at first is easy with plenty to explore and lots of objects to juggle with. Leaving the Opera House is problematic however, as you then have to locate the Phantom's lair, and there is only one way back in.

Humour abounds in the game, especially if you try to act out the role, and the usual Bignose play on obvious verb/noun commands is there.

I'm sure they only included a window for one purpose. It gives the impression that the game has been written by adventurers for adventurers rather than as an exercise in programming skill and technique, and is all the more playable for that.

At £5.95 for the cassette and £9.95 the disc the game is excellent value.

Scott Liddle, among others, has

been having a bit of trouble with the screening door in Hitch Hiker's Guide to the Galaxy from Infocom.

In view of last month's furore, I shall not reveal the full answer. Suffice it to say that when you have demonstrated enough grey matter then the door will allow you to progress. It knows what the score is.

If you are having trouble amassing points in HHGTG try being kind to animals, or being a bit of a boozer. Every little helps.

For those of you stuck in the vast expanses of Zork I, a little light-fingered assistance might help you to go to work on that egg. Also that black book may be a mass of help in ridding yourself of unwanted company.

If that rings any bells then it should also help you throw some light on the subject.

That's all for this month. Remember I need lots of glitches – especially an Infocom one – and next month is a sci-fi special with Level 9. Happy adventuring.

Glitchless into '86

ON to weightier matters. Where have all the glitches gone? Last month I used up the last of my current stock. Is not the thought of an *Atari User* T shirt for free enough? Please send those glitches in, as apart from anything else, it keeps the adventure writers on their toes.

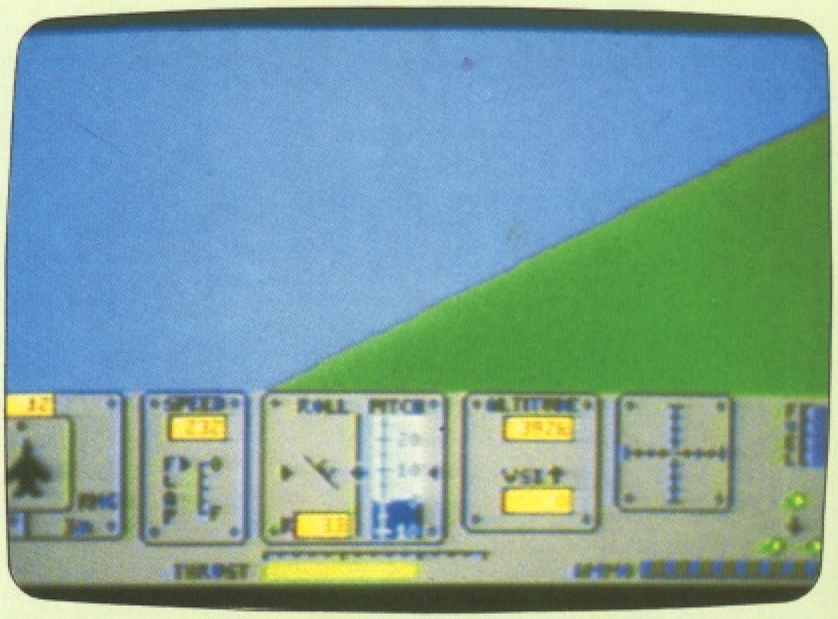
For instance, did anyone else notice the lengthy defence that Level 9 gave to their input analyser in the blurb for Red Moon which could occasionally throw up the odd strange message?

Other useful submissions are maps of completed games or hints on solutions.

Simon Ashford, of Birmingham, a previous glitch winner, has sent me a comprehensive map of Channel 8's Golden Baton. So in case you are having problems with the Gorgon, try reflecting on your possessions in order to progress.

You may also find more than just a needle in a haystack when you visit the shed. Thanks for your tips, Simon. I'm sure you will have helped someone somewhere with those.

Fighter Pilot is right on target



IF you've ever fancied your chances as a jet pilot, then Digital Integration's **Fighter Pilot** should appeal to you.

This aircraft simulation puts you in the pilot's seat of an USAF F15 Eagle jet fighter, with options to allow straightforward flying or air to air combat with enemy fighters.

From a menu of options you may choose to start your flight from take off position or landing approach. My disastrous attempts at landing soon convinced me that it was much easier to opt for take off.

Taking either of the combat options starts you off in mid-flight around 20,000 feet. You may select combat practice, where you are positioned two miles behind the enemy plane at approximately the same height.

If you can keep tail on the enemy it will appear in your gunsights at a distance of one mile, at which point with a little bit of luck you can blast it out of the sky.

In practice mode the enemy doesn't fight back, but with some experience you may like to attempt true air-to-air combat.

With this option you will track the enemy with the help of your on-board computers before shooting it down.

Be warned though, the enemy returns your fire, and it becomes a real dogfight.

If you really want to live dangerously you can lob in crosswinds and air turbulence, not to mention a blind landing in foggy conditions.

The screen display is excellent. The top section is the pilot's cockpit view, in which you see the horizon, the runways on approach to landing, and of course the enemy if you are in combat mode.

The lower half is taken up by the instrument panels.

There is quite a lot of detail to digest here and one soon learns the importance of keeping an eye on the most important instruments.

Quite often I found myself carefully holding a correct course while paying no attention to the fact that altitude was rapidly approaching zero.

The cockpit view can be changed to display a map of the area on which can be seen the four runways and various navigation beacons, and so on. Any enemy aircraft in the area are also identified if you are in combat mode.

I must confess to being a flight simulator addict, and I was particularly pleased with this program.

The instructions are adequate, all the available options are described together with the instruments and controls, and there's a little technical information to help you gain some flying experience.

The program also incorporates one of the latest innovations aimed at thwarting software pirates – Lenslok. For the uninitiated, this is a plastic lens that is folded and placed against the screen in order to read a security code.

It is quite easy to use and there's an optional tutorial mode to help you if you're at all uncertain. The protected program will only run if you enter the code correctly, and a different code is generated each time the program is loaded.

Hopefully developments like this will help to reduce software piracy. I certainly hope so because the program authors deserve their just rewards. It's a fine program and I enjoyed it immensely.

David Andrews

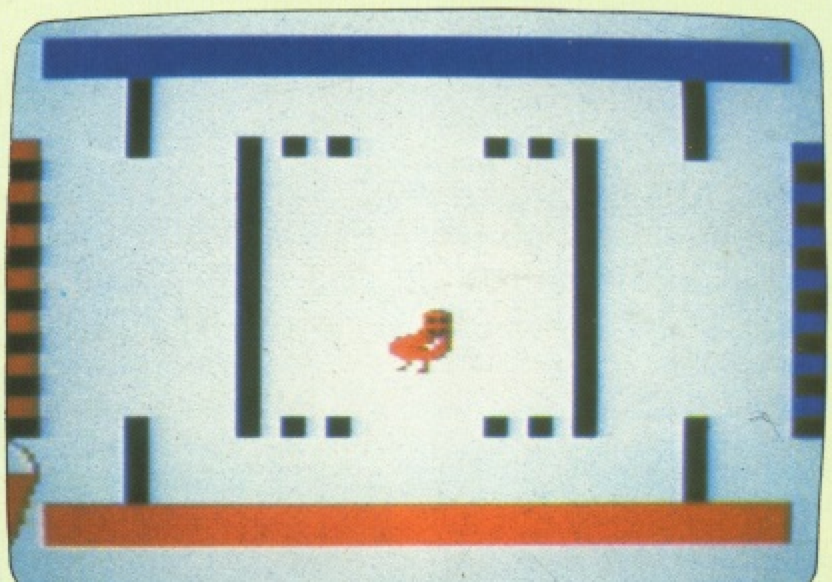
Mr Men do a good job

MR MEN books, ugh! Besides their obvious sexist bias, the story content never appealed to me. Why do young children love them?

I can appreciate that their simplicity is attractive, but how boring having to read them time and time again to my three-year-old.

I was aware that certain lesser computers had versions of Mr Men programs but I always congratulated myself on my choice of Atari because such programs were not for it.

Well Mirrorsoft has produced an Atari version of the highly-successful set of programs **"First Steps with the Mr Men"**.



With fear I loaded them, dreading the possibility that the magic moments I spend with my children learning Logo might be invaded by little fat men that had recently ruined the bedtime reading session.

There are four games in the set. They feature Mr Greedy, Mr Silly and Mr Forgetful.

The Great Ice Cream Hunt involves the child directing Mr Greedy around the screen to find a specially enormous ice cream.

It gets harder both for the child and Mr Greedy as he collects ice creams. Decisions have to be made about which way to send Mr Greedy.

This is similar to early Logo like activities and helps the child to grasp the concepts of direction while they control the computer.

The game is fun and much

to my surprise the little Mr Man is quite charming and seems well suited to the computer environment.

Mr Silly's hat game is a simple matching activity. Mr Silly chooses a hat and the child has to find it on the shelves.

Again it is fun, and the child who showed me how to operate it was quite content playing the game for a considerable period.

The colour and graphics are what you would expect from an Atari game and the program loaded and ran without any difficulty.

Mr Forgetful has to play the next two games. They are similar to the card game where you turn cards over and have to remember where pairs are. The child has to match up pairs of socks, shoes, roller skates and the like.

There are two rows of cupboards, six in each row, and the child directs Mr Forgetful to look into a cupboard.

One of the pair will be in the cupboard, and the child has to find the other half while accumulating knowledge about what's in the other cupboards.

This matching activity is extended to letters in the next game.

The Mr Men set of programs from Mirrorsoft are really good for young children. They provide a relevant use for the computer both at home and in school, providing the child with simple matching and pre-reading activities. They do this in a fun way.

It is good to see that thoughtful educational principles have been adhered to and that at last the little fat men have a useful task to perform.

They might leave story books alone, although I doubt it.

Alan Coode

Stand by with the insecticide

IN **Axis Assassin** from Ariolasoft your task is to fight off an army of insects which quickly multiply and attack you in droves. It's an interesting version of the well known arcade oldie Tempest.

Each screen holds a 3D grid and your object is to move your "man" around the perimeter and in and out of the grid in order to fight off the approaching enemy.

Battle begins after the Master Arachnid sends out a Spinner to weave strands across the grid. With an unlimited amount of ammo you must try and see off the meanies sent after you by firing at them down the corridors.

They take the form of Hunters, Drones, Spores and Xterminators and each has an individual mode of attack and its own points system. You have to try to destroy enough of the enemy to make the Master Arachnid re-appear.

When he does you can zap him with a pulse bomb. Alternatively you can race on to a faster more ferocious screen.

If you choose to zap the Master and succeed you enter another mode which is rather like an Asteroid game.

This time you have to rescue a fellow Assassin who has been captured and lies imprisoned in a central box along with the Master.

Shoot away enough of the box to allow you to get in and you can attempt, within a set time limit, to rescue your comrade without touching the walls of the box or the Master himself.

To add to your troubles the other insects float towards you like asteroids. Contact with anything means annihilation.

If you can rescue your colleague you are awarded an extra man. Fail and you lose one. Either way you move on to the next grid to start the battle over again.

There are three levels of play and 20 different grids, each increasing in difficulty.

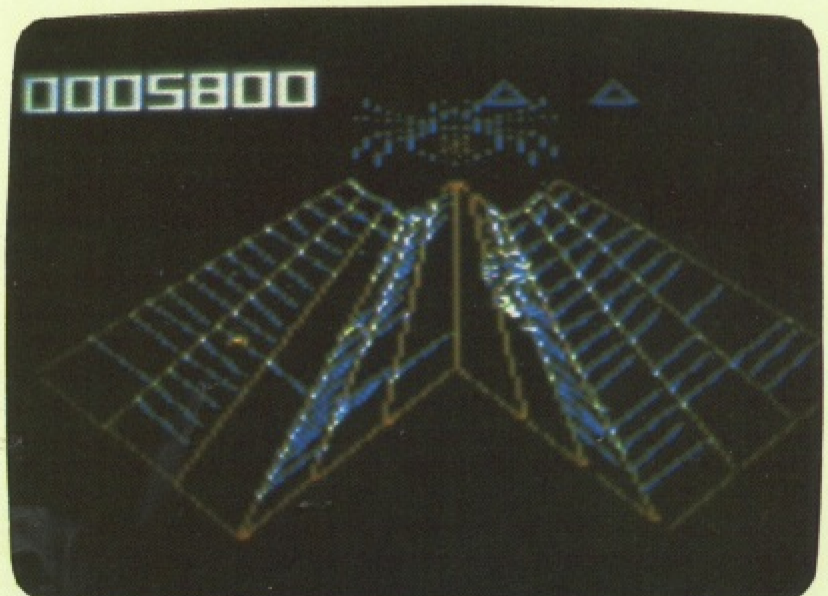
Handily you can start at any you want, which removes the necessity of ploughing through earlier screens once you find them too easy.

However you would be well advised to start on the earlier screens on the higher levels.

The game kept me interested for a while but lacked the variety to make it really addictive. The graphics are acceptable but not up to the Atari's capabilities – all the characters and scenery are based on wire frame shapes.

It's one of Ariolasoft's Mid-Price series so the disc will only set you back £9.95, with the cassette costing £2 less.

David Andrews



The high price of war

IT seems that every second computer wargame that arrives from the States now is besotted with the German Wehrmacht, and this new release from Strategic Simulations is no exception. However this minor criticism should in no way deter any one from buying **Panzer Grenadier.**

The Panzer Grenadiers of the Second World War were an elite mobile infantry force, trained to move with and support the powerful armoured divisions of the German army.

In this program, Roger Damon sets out accurately to simulate the desperate actions of this crack German force as it attempts to stem the Russian advance on the Eastern front.

You are given the option to either enter a saved game or start a new one choosing from one of five scenarios.

Each is set on the Eastern front after the massive German offensive of 1941/42 has ground to a halt, and the Russian steamroller has begun to gain momentum. The first scenario, Bridges over the Lutchessa, is an ideal introduction for the novice player.

You can select a level of play from one to three which

caters adequately for beginners and experienced players alike.

SSI has moved away from the normal wargame screen format and given us a very good smooth scrolling terrain map with all features such as woods, ridges, roads and rivers very well depicted.

Troop types are represented by easily-recognisable icons, and all orders and moves are given via the joystick, which helps playability.

Play is broken down into eight phases which cover movement and firing for both sides, with a victory phase at the end which gives an assessment of your overall play.

As is usual in SSI games, opportunity is given at the end of each turn to save the game.

I rate Panzer Grenadier quite highly. The game is well packaged, and has a well-written, easy to follow instruction manual.

The program is strong both in graphics and playability. However I find it hard to come to terms with a £35 price tag.

Also there is no provision for the creation of your own scenarios, a major drawback in a game of this type.

John Minchin



A colourful starter pack for ST adventurers

BEING the first Atari ST adventures I had encountered, I was full of glee when asked to review **The Lost Kingdom of Zkul** and **West.**

They are both text adventures and are produced by Talent Software, better known for their contributions to the Sinclair QL range.

The first thing that struck me was their size. Zkul weights in at 73k but West is a smaller 49k. Talent tell me that West is purely an introduction to adventuring. Be that as it may, it is really very small compared to what it could have been on the ST.

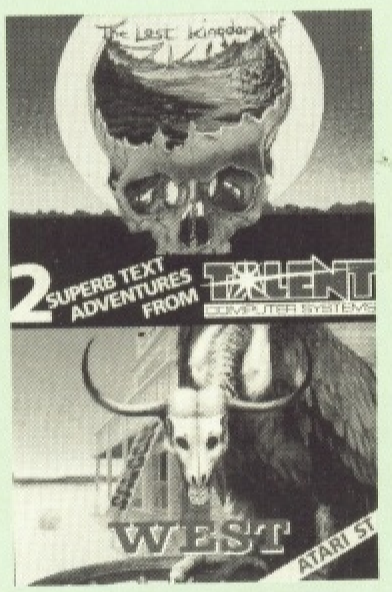
Both games have loading screens. To say they are spectacular is an understatement. They have to been seen to be believed, leaving 8 bit screens way behind.

They are both colourful and detailed, staying on the screen until you press a key, at which point the main game loads.

Let's look at West first. The vocabulary is reasonably large but mostly I found it limited to two word entry.

The plot involves tracking down bank robbers and duly killing them, before taking the money they stole back to the bank. During this time, you will find yourself being promoted to sheriff.

The game plays fairly well as far as it goes – it really is for



beginners. The biggest problem is that it is in real time. Nice idea, but if you cannot type quickly then you can find yourself dead as the robbers shoot quite fast and don't wait for you.

Anyone who has played adventures before might get bored with West. The idea of a western adventure is quite a good one but the plot didn't quite gel for me as there didn't seem to be an objective.

However if you have never played a Talent adventure before then it's a good idea to play West just to get used to their system.

Zkul, on the other hand is quite different. The idea is to find as much treasure as possible and return with it to a hut in the great forest where your friend Eldomir waits for you.

The scenario goes thus: Long ago there was a battle between humans and dwarves. The latter won but took heavy losses and so lately there have been very few of the little chaps around.

The battle has lapsed into legend but it is said that in the domed city there is lots of loot. So you have been sent by your friend to find both city and loot.

When you do see dwarves they don't wait around long. They can be useful, but it's up to you to find out how.

So far I have mapped about half of the game and believe me, it's a very big adventure to play.

If you get stuck just wait a bit and sometimes the computer will offer you a clue. However it takes points off your score in payment.

There is the standard help and a health command which, when entered, tells you the condition of your character – very neat.

Zkul is quite complex but not so much that it is impossible to continue without solving a problem. Be wary of trap rooms, but quick thinking can usually produce a way out of them.

If you get stuck in a room with shrinking walls a bit of mathematic progression on a certain word might help you out of it.

A strange man appears occasionally and takes all your treasure. To get it back you have to find his lair.

A strange thing about this adventure is that it does not give you directions in certain places, which makes mazes a real headache. This does add a touch of reality, for you lose your sense of direction in real mazes too.

There are plenty of locations to wander about and problems to be solved, which combine to make a pleasant adventure that takes a fair while to crack.

Zkul is not for the novice but West is. The combination makes a good starter pack for novice adventurers. It's quite a fair package for the average ST owner and is worth buying just for Zkul. With West included, at £24.95 it makes an attractive buy to anyone.

Jed Glover

ACCESS ORDERS NOW TAKEN

Haystack Peripherals

Atari Software

Haystack Peripherals

8 Midgrove, Delph, Oldham OL3 5EJ. Tel: 04577 5229

THIS MONTH'S EXTRA SPECIAL OFFERS!

CREATIVE SPARKS	Cass
Computer War	**4.90**
Desmonds Dungeon	**4.90**
Special Delivery	**4.90**
Double Pack	**9.40**
Triple Pack	**13.50**

U.S. GOLD	Cass
Caverns of Khafka	**4.90**
Slinky	**4.90**
Double Pack	**9.40**

DISC — U.S. GOLD	Disc
E-Factor	**6.40**
Meltdown	**6.40**
Spider Invasion	**6.40**
Double Pack	**12.40**
Triple Pack	**18.00**

	Cass	Disc
ACTIVISION		
Ball Blazer	8.90	12.90
Decathlon	8.90	
Eidolan*	8.90	12.90
Gt. Am. Road Race	8.90	12.90
Ghostbusters		12.90
Hacker	8.90	12.90
Koronis Rift*	8.90	12.90
Mindshadow*		12.90
Pitfall II	8.90	
Rescue on Fractalus	8.90	12.90
Space Shuttle	8.90	
ANIROG		
Jump Jet	8.40	10.40
ARIOLASOFT		
Archon	9.90	12.90
Archon II*	8.90	10.90
Axis Assassin	6.90	8.90
D-Bug	6.90	8.90
Golf Cons. Set*	10.40	13.40
Hard Hat Mack	8.90	10.90
MULE	9.90	12.90
Murder on Zinderneuf		12.90
Music Cons. Set		12.90
One on One	8.90	10.90
Pinball Cons. Set		12.90
Paintbox*	15.90	15.90
Realm of Imposs.*	8.90	10.90
Seven Cities/Gold		12.90
Think*	7.90	
BEYOND		
Spy vs Spy	8.90	
CREATIVE SPARKS		
Spot the Ball	8.90	
DATABYTE		
Boulderdash II*	9.90	12.90
DATAMOST		
Mr Robot		12.90
DIGITAL INTEGRATION		
Fighter Pilot	8.40	11.40
ELECTRIC DREAMS		
Spy's Demise	8.90	10.90
ELITE		
Airwolf	8.40	
ENGLISH		
Chop Suey	7.90	10.90
Colossus Chess	8.90	10.90
Elektraglide	7.90	10.90
Hijack	6.90	9.90
Kissin' Cousins	5.90	
Mediator*	7.90	12.90
Smash Hits 1	13.40	15.90
Smash Hits 2	13.40	15.90
Smash Hits 3	13.40	15.90
Smash Hits 4	10.40	13.90
GREMLIN GRAPHICS		
King of the Ring	8.40	11.40
Zone X	8.40	11.40
ICD		
Spartados		35.90
US Doubler		69.90
LEVEL 9		
Adventure Quest	8.40	
Colossal Adv.	8.40	
Dungeon Adv.	8.40	
Emerald Isle	5.90	
Lords of Time	8.40	
Red Moon	5.90	
Return to Eden	8.40	
Snowball	8.40	
Worm in Paradise	8.40	
LLAMSOFT		
Colourspace	6.40	
Hover Bovver	6.40	
Mutant Camels	6.40	
MELBOURNE HOUSE		
Mordon's Quest	5.90	
William Wobbler*	8.90	
MIRRORSOFT		
Boulderdash	8.90	
MOSAIC		
Secret Diary/Adrian Mole	8.40	
NOVAGEN		
Encounter	8.90	11.40
Mercenary	8.90	11.40
PRECISION		
Superscript		57.90
PSS		
Theatre Europe	8.90	
SIERRA-ON-LINE		
Dark Crystal		25.90
Mission Asteroid		19.90
Ultima I		19.90
Ultima II		25.90
Ulysses		25.90
Wizard + Princess		19.90
STRATEGIC SIMULATIONS		
Battalion Commander		33.90
Battle of Antietam*		47.90
Breakthrough/Ardennes		54.90
Broadsides		28.90
Carrier Force		54.90
Colonial Conquest		33.90
Computer Ambush		48.90
Computer Baseball		33.90
Computer Quarterback		33.90
Cosmic Balance		32.90
Cosmic Balance II		32.90
Cytron Masters		25.90
Eagles		33.90
Field of Fire		33.90
Fortress		33.90
Galactic Adventurs		55.90
Gemstone Warrior		33.90
Imperium Galactium		33.90
Kampfgruppe		47.90
Objective Kursk		33.90
Operation Mkt Garden		47.90
Panzer Grenadier		33.90
Questron		49.90
Rails West		33.90
Reforger 88		47.90
Six Gun Shootout		33.90
U.S.A.A.F.*		47.90
War in Russia		64.90
50 Mission Crush		33.90
SUBLOGIC		
Flight Simulator II		38.90
US GOLD		
Aztec Challenge	7.90	
Beach Head		12.90
Blue Max	8.40	12.90
Blue Max 2001	8.40	12.90
Bounty Bob	8.40	
Bruce Lee	12.90	12.90
Conan		12.90
Crusade in Europe*	17.40	17.40
Dig Dug	12.90	
Drelbs	8.40	12.90
Drop Zone	8.40	12.90
Forbidden Forest	7.90	
Fort Apocalypse	8.40	12.90
F15 Strike Eagle	12.90	12.90
Ghost Chaser	8.40	
Goonies	8.40	12.90
Kennedy Approach	12.90	15.40
Lucifer's Realm		12.90
Mig Alley Ace	8.40	12.90
Mr Do	12.90	
Nato Commander	8.40	11.40
Pacman	8.40	
Pole Position	8.40	12.90
Quasimodo	8.40	12.90
Snokie	8.40	
Solo Flight	12.90	12.90
Spitfire Ace	8.40	11.40
Spy Hunter	8.40	12.90
Strip Poker	8.40	
Summer Games		12.90
Super Zaxxon	8.40	12.90
Tapper	8.40	12.90
Up'N'Down	8.40	12.90
Whirlinurds	8.40	12.90
Zaxxon	12.90	
Zorro	8.40	12.90

Prices Include VAT and Carriage

Callers by Appointment only

C15 COMPUTER CASSETTES (Box of Ten) £4.50

* Please ring to confirm availability.

Cheques *(Please write card No. on reverse)* ***or P.O.'s to: HAYSTACK PERIPHERALS.***
Please State 'ATARI' when ordering.
Please state Cassette or Disc.

MICROWORLD

BRANCH NETWORK THROUGHOUT THE U.K.

· CALL 01-627 4840 ·

LONDON
Park House
140 Battersea Park Road
London SW11 4NB
01 627 4840

GLASGOW
11 Bath Street
Glasgow
041 332 1116

EDINBURGH
4 St. Andrew Square
Edinburgh EH2 2BD
031 557 4196

12 Leven Street
Tollcross, Edinburgh
031 228 1111

ABERDEEN
77 Holburn Street
Aberdeen
0224 571735

ATARI 520ST

FEATURES

1 512K Ram
2 68000 Processor with networking
3 Professional Software free
4 512 Colours on screen
5 8MHz clock speed
Gem operating system
Complete system CPU, Disk Drive, Monitor and Mouse included
Free software includes Basic, Logo, Gemwrite, Gempaint.

with printer

ONLY £749 Inclusive of VAT



Special Offer: FREE Olivetti JP101 sparkjet printer worth **£299!** with every 520ST.

How to Order

Orders by post welcomed: please mail coupon with payment.
Telephone orders welcome: call 01-627 4840 (London) or 031-228 1111 (Edinburgh) or 041-332 1116 (Glasgow) or 0224 571735 (Aberdeen).
We also welcome Government and Educational orders.
All products supplied include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.
Order with confidence, 7 days money back guarantee.
All charges include VAT and carriage charges by courier. Dealer enquiries and personal callers welcome. All offers stated here are available through any of Microworld's 50 dealers nationwide.
The right is reserved to alter prices without prior notice.
All items subject to availability. E&OE.

MAIL ORDER

To: Microworld Distribution, Dept. ATU, Park House, 140 Battersea Park Road, London SW11
01-627 4840

Please send me ______________________

☐ I enclose a cheque for £ .... payable to Microworld Computer Systems Ltd.

☐ Please debit my Access/Visa/American Express Account

No ______________ Signed ______________

Name ______________ Address ______________

P.F. SOFTWARE
SMART ART (16k)

- OVER 80 DIFFERENT COLOURS CAN BE DISPLAYED AT ONCE
- INTERRUPT DRIVEN CURSOR
- 4 BRUSH SIZES
- 3 BRUSH SPEEDS
- AIR BRUSH MODE
- PLOT
- DRAWTO
- FILL
- DRAW BOX
- DRAW CIRCLE
- SAVE PICTURE
- LOAD PICTURE
- SEPARATE PROGRAM TO DISPLAY PICTURE
- DEMO PICTURE

AVAILABLE ON CASSETTE FOR ALL ATARI 8 BIT COMPUTERS ONLY . . . £3.50
(Previous purchasers of Art Atari can upgrade to SMART ART for only **£1.00**)

ALSO AVAILABLE

BLACKJACK (16K) Realistic card display	£1.95
PICTURE PUZZLE (32K) Two pictures to choose from	£2.95
PICTURE TORMENT (16K) Very difficult	£2.95
FRUIT SALAD (16K) Colourful version of mastermind	£2.95
FRUIT PICKIN (16K) Arcade action	£2.95
(Order both FRUIT SALAD & FRUIT PICKIN for only	£4.50)

Cheques & P.O.'s to:
(Overseas orders for single programs please add £0.50)

P.F. SOFTWARE (Dept AU)
14 KIRKSTALL AVENUE
LITTLEBOROUGH
LANCS. OL15 9JA

LADBROKE COMPUTING INTERNATIONAL for ATARI

DIRECT AMERICAN IMPORTS FROM OUR USA BRANCH
PLUS
BULLETIN BOARD WITH PUBLIC DOMAIN DOWNLOAD SOFTWARE



33 Ormskirk Road, Preston, Lancashire PR1 2QP
Tel: (0772) 21474
Mail order: (0772) 27236 – 10am-6pm
Bulletin Board: (0772) 27236 – 6pm-9am
VISA and ACCESS welcome

SERIOUS BUSINESS OR SERIOUS HOBBY

OUR SERVICE DOESN'T STOP AT JUST GIVING COMPETITIVE PRICES AND A FAST FRIENDLY SERVICE. WHY NOT JOIN OUR COMPUTER DISCOUNT GROUP. SPECIAL ACORN, AMSTRAD & ATARI 520ST SUPPORT SECTIONS. LARGE RANGE OF ATARI 520ST PRODUCTS CURRENTLY AVAILABLE.

COMPUTERS

Amstrad CPC6128 from	£249.00
Amstrad PCW8256	£390.00
Atari 520ST/Drive/Mon/Soft	£586.00
Atari 520ST/Printer/Hard Disc – Special package deal	PHONE
Full replacement warranty scheme for business & individuals	PHONE
Atari Software/Books – Wide Range	
Atari 500K Add. Drive	£116.00
Atari 1M Add. Drive	£155.00
Atari 10Mb Hard Disc	£430.00
KECM/520ST 20Mb/Hard Disc	PHONE
KECM/520ST Professional System – Built in PSU + 1MB/Hard Drives	PHONE
KECM/520ST Monitor/Dr. Stand	£26.00
KECM/520ST Printer Stand	£20.00
KECM/520ST 3.5" Drives	PHONE
KECM/520ST OTHER PRODUCTS OUT SOON	
Atari 520ST Printer Lead	£15.00
Atari 520ST Serial Lead	£12.00
Atari 520ST/Video Leads/Kaga/Microvitec/etc. from	£10.00
BBC Model 'B' Plus	PHONE
Commodore Products	PHONE

MONITORS

Kaga Vision I	£199.00
Kaga Vision II	£220.00
Microvitec 1431	£165.00
Microvitec 1451	£215.00
Philips 7502	£65.00
Philips Colour Range from	£185.00
Philips 2007 Colour TV/Monitor	£186.00

PRINTERS

Canon PJ1080 Colour	£379.00
Canon PW1080A NLQ	£260.00
Cannon PW1156A NLQ	£345.00
CCP40 Colour Plotter	£70.00
Daisystep 2000	£218.00
Epson DX100	£314.00
Epson FX100	£425.00
Epson LX80 NLQ	£197.00
Epson LQ1500	£870.00
Juki 2200	£235.00
Juki 5520 Colour	£370.00
Juki 6000	£195.00
Juki 6100	£295.00
Juki 6200	£485.00
Juki 6300	£745.00
Kaga 810 NLQ	£229.00
Kaga 910 NLQ	£344.00
Mannessman MT80+	£190.00
MP165 NLQ	£219.00
Sakata SCP-800 Colour Plotter	£165.00
Smith Corona Fastex 80	£139.00
Smith Corona D100	£179.00
Smith Corona L1000	£235.00
Star SG10	£219.00
Shinwa CPA80	£185.00
Full range of Printer Leads	PHONE

DISC DRIVES

Ahkter/Cumana/KECM/Opus	PHONE

3.5" DISC'S

Fuji 3.5" MF1DD SS from	£2.15
Fuji 3.5" MF2DD SS from	£3.15

PLEASE PHONE IF YOU CANNOT SEE THE PRODUCTS YOU NEED

All prices exclude carriage & VAT. We carry most leading brand names. Please ring to confirm latest prices – You will find us unbeatable. For more information on how to get our regular discount price list & details of our other services, contact:

K.E.C.M.

(KNIGHT ELECTRONICS COMPUTERS & MUSIC)
8 WESTWOOD LANE, WELLING, KENT DA16 2HE. TELE: 01-301 3745 (10am-10pm)
CALLERS BY PRIOR APPOINTMENT ONLY

TWO WAYS TO ENSURE YOU GET

ATARI USER

EVERY MONTH

1. Complete and mail subscription form on Page 61.
2. Hand this form to your newsagent.

Please reserve me a copy of Atari User magazine every month until further notice.

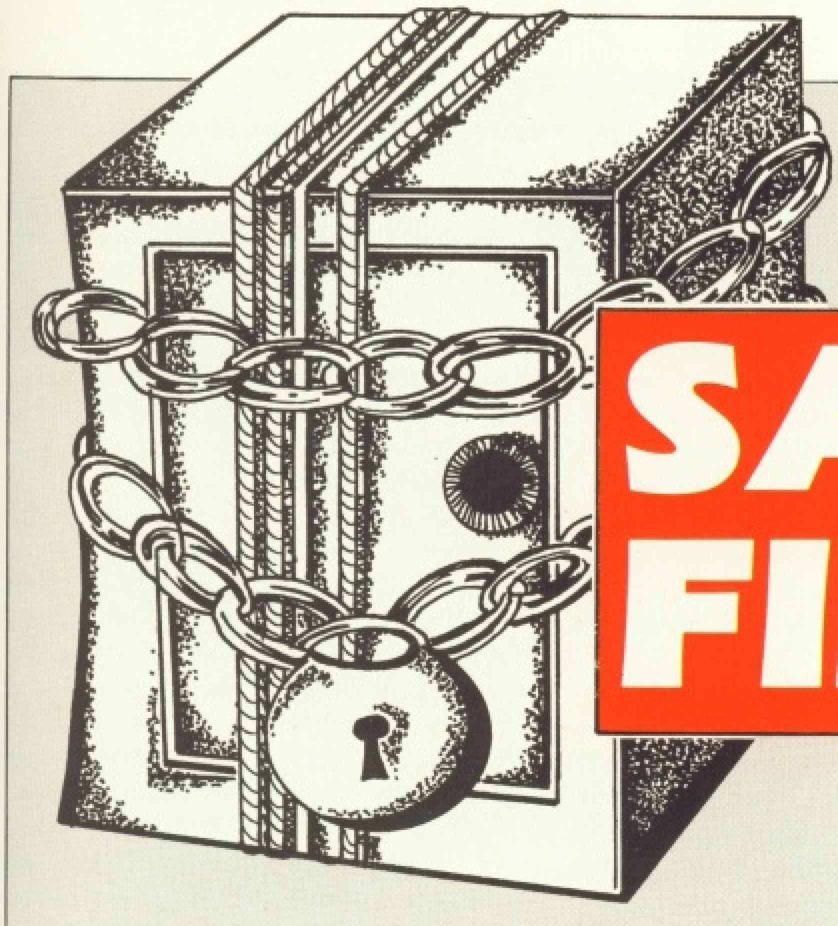
☐ I will collect

☐ I would like it delivered to my home.

Name ____________________

Address ____________________

Note to newsagent: Atari User should be obtainable from your local wholesaler, or contact Steve Fletcher, Circulation Manager on 0293 27053.



SAFETY FIRST

LEN GOLDING shows how to keep your precious data safe from Basic's ruthless memory management

THE Atari's most advanced features all involve storing lists of numbers in an area of memory which cannot be accidentally erased or over-written.

Player-missile graphics and re-defined character sets require data tables. Custom graphics modes, DLIs and scrolling techniques need special display lists. Page flipping needs space for the extra screens. Vertical blank interrupt and other machine code routines require a safe environment to work in.

Basic does its own memory management, which means that it will cheerfully wipe out anything beyond its ken. This article explains several techniques for making sure your safe areas stay that way.

First, a quick review of how memory is organised when you switch on. Figure I is a simplified memory map which shows how the address space of a 48k machine looks

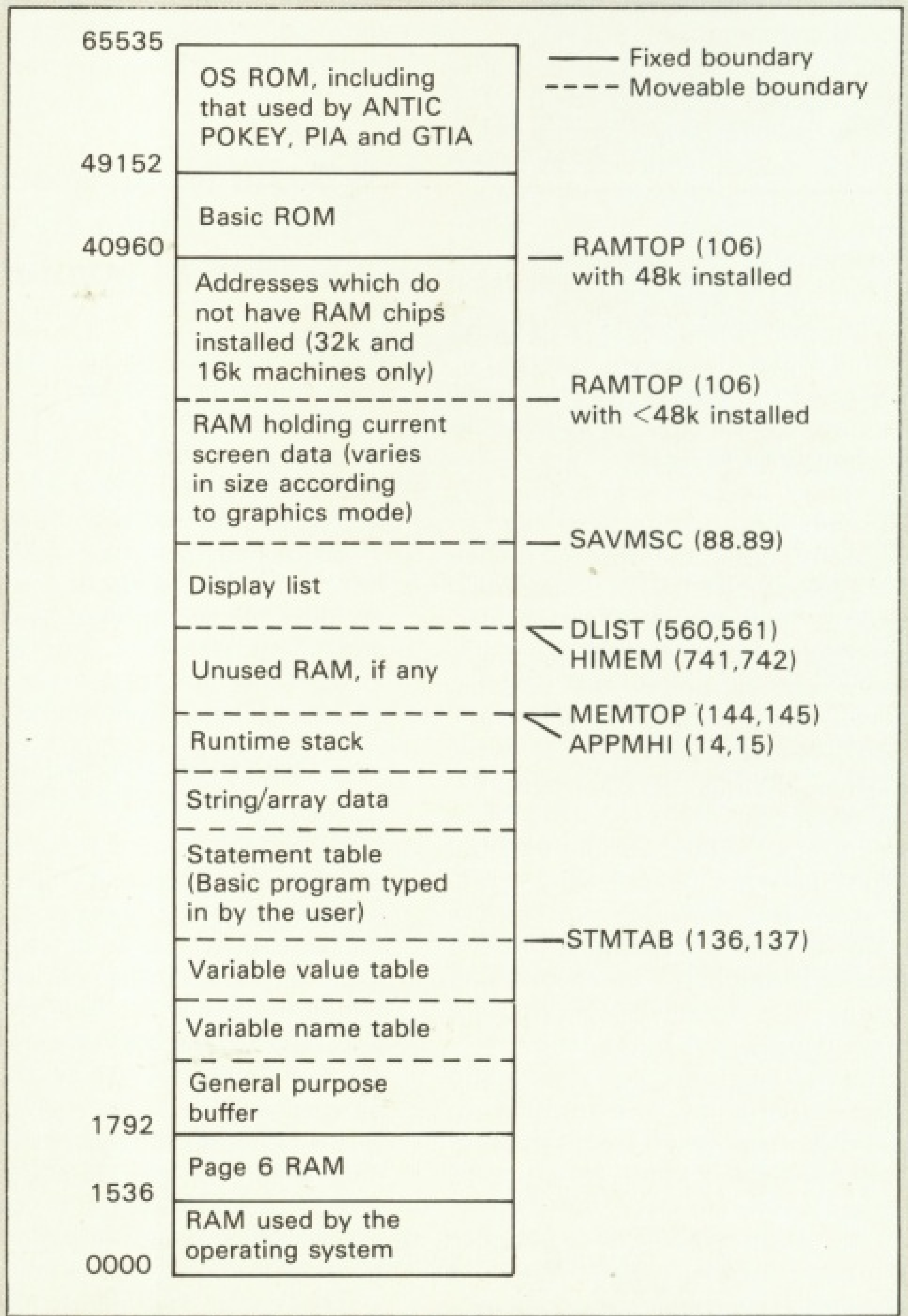


Figure I: Simplified memory map

at power-up with a Basic program in place and no peripherals attached.

The high end of memory from 40960 onwards is occupied by ROM, while the first five pages of low memory – 0 to 1535 – are reserved for use by the operating system.

A 256 byte data buffer starts at 1792, then Basic begins to build various tables which change size as programs are typed in.

Your program itself is contained in a block called the statement table. It starts immediately after the variable value table and grows upwards in a single continuous block, moving up or down in memory as the tables below it expand or contract.

Data for all the strings and arrays are placed at the end of the statement table, followed by a small buffer used as a stack to serve FOR . . . NEXT and GOSUB commands.

The high end of user RAM contains current screen data and the display list. This area grows downwards as graphics modes with higher RAM requirements are selected during program execution.

Needless to say, any foreign data in Basic's path gets wiped out.

With everything moving around like this, it would be very risky to put your precious data just anywhere. Fortunately there's plenty you can do to keep things secure.

A "page" of computer memory is 256 bytes long, so the sixth page of your computer's memory stretches from 1536 to 1791. This is supposed to be an automatically safe area, since it is not used by the operating system and is below the address where Basic programs start.

Unfortunately the first 128 bytes are used to hold the data overflow whenever an INPUT statement collects more than 128 characters.

This does not happen very often, but you need to watch out for the possibility and, if necessary, provide software protection. The second half of page 6 is totally secure, but of course is only 128 bytes long.

Several regions are set aside automatically by the operating system for use when information is being transferred from one place to another.

If no such transfers can occur during program execution it is possible to use these buffers as safe storage areas. The two most valuable are the cassette buffer (1021-1151) and the printer buffer (960-999).

They are particularly useful for data or routines which are used only once at the very start of a program, then discarded. For example, machine code routines to initialise pointers or set up data tables, or custom display lists for title pages.

They can be used for longer term storage so long as your software seals off all access to the relevant devices for as long as the data need to be remembered.

Basic keeps track of all its tables by using a system of pointers. These are fixed memory locations which do not themselves contain raw data, but instead hold an address where moveable data can currently be found.

There is one to show where screen data start, another pointing to the display list, others to show where your Basic program and its various tables begin and end, and many more.

‘Basic keeps track of all its tables by using a system of pointers’

Most pointers consist of two consecutive bytes. The first contains the low byte of the address it points to, the second the high byte.

So to find the actual address you PEEK at both halves of the pointer, multiply the second half by 256 and add it to the first. For example, locations 88 and 89 point to the start of your screen display data:

```
SAVMSC = PEEK(88)
+ 256 * PEEK(89)
```

If you POKE any number from 0 to 255 into this address it will be printed as an Atascii character at top left of the screen. If you select a different graphics mode, the address contained in SAVMSC will change to point to the new start of screen data. All the pointers work in this same general way.

So although the various blocks of data set up by the OS must not be broken up in any way, it is possible to shunt them around in memory by altering their respective pointers.

The easiest pointer to change is RAMTOP (106) which tells the OS how many pages of memory are available. If you subtract 1 from the number stored in RAMTOP, then POKE it back in and execute a graphics command, the screen data and display list will move downwards by 256 bytes, leaving this amount of "spare" RAM above it which Basic cannot see.

You can save any multiple of 256 bytes in this way, so long as the display list is not forced to descend below the address pointed to by APPMHI (14,15).

This method is quick, simple and reliable, and is commonly used in magazine listings, but a quirk in the operating system reduces its appeal.

Whenever you execute a graphics or a clear screen command, the first 64 bytes above RAMTOP are wiped out. Even worse, scrolling a text window may erase up to 800 bytes in the supposedly safe area, so watch out.

Changing HIMEM (741,742) will let you reserve space just in front of the display list, and ensures that Basic will give an error message if your program grows long enough to interfere.

You must leave enough space to accommodate all the graphics modes your program uses, otherwise screen data will descend during program execution and over-write your reserved area.

Simply enter the mode which will take up most RAM and find the address contained in HIMEM. This is the last safe address you can use. Then work out how much memory you want to reserve, calculate where you want the safe area to start and POKE this new address into HIMEM.

One point to remember when changing either RAMTOP or HIMEM is that not all computers are 48k machines. You cannot put a reserved area where no RAM is installed. For this reason, it's usual to make your program PEEK the pointer's initial value, then subtract a fixed amount and POKE the new value back.

This means, of course, that the reserved area will occupy different locations in different machines, so you can't specify absolute addresses within the safe area for Basic to PEEK and POKE. Nor can you use this method to store non-relocatable machine code routines.

But it is the easiest way of

ensuring that your reserved area starts on a 1k or 2k boundary, so you can use it to protect PM data, display lists, character sets and the like.

The bottom end of memory looks the same whatever your computer's memory size, so if you reserve space by shunting MEMLO upwards you can predict precisely where the safe area will be.

This opens up possibilities for absolute addressing, and allows large amounts of non-relocatable machine code to be stored. Several peripheral devices which need special software to drive them, say disc drives, start off by booting a short machine code program to reset MEMLO, then load their driver software into the reserved space.

Unfortunately you can't simply write a Basic program to POKE a new address into MEMLO, since this would in effect tell the computer that your Basic program itself had suddenly disappeared.

If you want to alter MEMLO you really need to do it before your Basic program is loaded, and this means a machine code subroutine.

Another problem is that SYSTEM RESET will automatically set all pointers back to their default values. This isn't a problem for those pointers which are reset within your Basic

"Basic automatically ensures that strings do not overlap each other"

program, since they'll change back to the values you want every time the program is RUN.

But for MEMLO the only solution is to trap the SYSTEM RESET routine, which again needs machine code. This is a bit beyond the scope of the present article, but a suitable program is given in De Re Atari.

The Atari can handle strings of any length up to its memory size. There is plenty of scope for storing data tables and machine code routines so long as they are the kind that can sit anywhere in memory.

Basic automatically ensures that strings do not overlap each other or any of the various tables, and you can always find any string by using the ADR function.

They can't be used to hold things like character sets, display lists and player-missile data, which need to start on 1k or 2k boundaries, since strings move around in memory and you can never predict where they will finally settle.

There are two common ways of getting data into a string – entering it from the keyboard in literal form or building it from READ and DATA statements. The first is the easiest. Simply translate your numerica data into Atascii symbols, then type a program line with the symbols between double quotes:

```
10 DIM A$(5):A$="(2<Pd"
```

This will store the numbers 40, 50, 60, 80 and 100 in A$. There are two drawbacks to this technique.

Firstly the length of a literal string is limited to what you can get on a single program line – about 106 bytes.

Secondly some characters are hard to store in literal form: the numbers 34 (double quotes) and 155 (end-of-line) need special attention, along with all those numbers which translate into screen editing characters.

The length problem can be overcome by concatenating several literal strings in the usual way:

```
10 DIM A$(10),B$(5)
20 A$="ABCDE":B$="FGHIJ"
30 A$(LEN(A$)+1)=B$
40 PRINT A$
```

By this method A$ can be made as long as you like; it will still tuck itself safely away in memory with its first byte at ADR(A$).

Awkward characters are a bit more tedious to deal with. Number 34 can be forced into a literal string after it has been typed:

```
10 DIM A$(3):A$="X*Y":
A$(2,2)=CHR$(34): PRINT A$
```

Control characters such as 125 (clear screen), 28 (cursor up) and 253 (bell) can be forced into the string in the same way, but you won't be able to print them out unless you first disable the control functions by POKEing a non-zero number into address 766. CHR$(125) will then appear as the familiar bent arrow, for example, instead of clearing the screen. Use this to check that the string is correct, then POKE 766,0 or press Break to restore the control functions.

The only number that can never be printed as a screen character is 155 (end of line). If you must have this number in a string, the only way to check it is by retrieving the string data in numeric form:

```
10 FOR X=1 TO LEN(A$):PRINT
ASC(A$(X,X)):NEXT X
```

The beauty of literal strings is that they put data straight into memory without wasting time and space on a loading routine. However typing long lines of apparently meaningless

"Large data tables can leave the user hanging around for half a minute"

symbols is not a job well suited for human operators and if, as is very likely, you make an error, it can be very difficult to find.

You can get round this problem by using a loader routine to build the string from scratch every time the program is run:

```
10 DIM A$(6)
20 FOR X=1 TO 6
30 READ D:A$(X,X)=CHR$(D)
40 NEXT X
50 DATA 35,36,37,38,39,40
```

You can store any number without difficulty in this way, since you don't need to PRINT the characters on screen. The main drawback is the time it takes to build the string.

Long machine code routines, or large data tables can leave your user hanging around for half a minute or more every time the program is run.

You can sometimes get the best of both worlds by using a short utility program to build a string from READ and DATA statments, then print it in literal form so that you can enter it as a program line. Try adding to the program above:

```
60 PRINT "100 A$=
";CHR$(34):A$;CHR$(34)
```

then RUN it. The new line 100 is all you need to insert permanently in your program.

You can put numbers directly into arrays and matrices without the

→

bother of converting to and from Atascii symbols, and the entries can be changed easily without restoring to string manipulation techniques, so it looks like an attractive option.

The snag is that every number will be stored as a floating point decimal, and use six bytes instead of the one required for an Atascii character. Try to avoid this method unless it has special advantages in your particular situation.

Basic ignores everything after a REM statement, but will not overwrite it. So if you store anything there it will normally be quite safe. Data can be inserted as Atascii symbols immediately after the REM statement. For example:

10 REM a! @5%

will store the numbers 97, 33, 32, 64, 53 and 37. Note that any space other than the one immediately following REM is interpreted as the number 32. The problem now is finding where Basic will store it in memory. This can be done only if the REM is at the very start of your program.

STMTAB shows where the first line starts, but there are five bytes to skip over before you get to the data (these hold the line number, line length, statement length and the token for REM). So your data start at PEEK(136) + 256*PEEK(137) + 5. You cannot store more than about 112 bytes in this way, and the technique is relatively cumbersome.

> **"Once settled into a finished program REM will stay in the same place"**

A REM statement will not occupy the same position in RAM for every program – that will depend on the size of the variable name and variable value tables. But once settled into a finished program it will stay in the same place no matter what the host computer's memory size, which could be an advantage sometimes.

Finally we ought to consider the easiest option of all – leaving data in the unprotected area marked "Free RAM" in Figure I. This puts the onus on you the programmer to ensure that things don't overlap, rather than leaving it all to the operating system.

You have to work out the lowest address to which your screen data will descend during the program execution and the highest address of your finished Basic program. Anything in between should be relatively safe.

You can use this technique during program development, especially if your machine has lots of spare memory, but it's better to choose one of the safer methods for the finished version.

AS more and more of you out there in Computer-User-Land have been buying Atari ST computers, the kind people at *Atari User* have decided to devote a special area of the magazine for your questions and problems whether software or hardware related.

Following my article on C and the ST in last month's issue, I have been put in charge of this new idea and been told to get on with it.

I hope to answer your queries and generally ease your problems, to the best of my ability. I'll also include a hint section, so if you have any that you'd like to pass on, please write to me at: Atari User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

ANDREW BENNETT begins a regular column especially for users of the Atari ST

Problems

Two monitors?

The first problem this month comes from L. Groves of Swindon. He bought a 520ST with black and white monitor and has recently added a colour monitor to his hardware collection.

His question, which will be repeated by every new owner of an ST – and was by myself – is whether it is possible to make a cable to connect both monitors at once.

In theory this would mean that all three resolutions would be available on the Set Preferences menu and that a certain resolution would be displayed on the appropriate monitor. Let me try to settle this issue once and for all.

If you have ever looked at the monitor socket on the ST you will see that it has an incredible 19 holes for the monitor cable's 19 pins.

Some of these pins are for a colour monitor and some for a black and white one. Making a cable that somehow connects both monitors to their respective pins would be difficult, but not impossible.

Unfortunately the ST 'looks' at a certain pin of the 19 called B&W Detect to see whether a black and white monitor is connected. If it is, it will ignore the colour monitor.

You could overcome this problem with some simple electronics to make the ST think that the black and white monitor isn't connected – when in fact it is – and therefore make it able to use both monitors.

The biggest problem with connecting two monitors, however, is far more difficult to overcome. Normally the first thing a program does is to look for which type of monitor is connected and then take the appropriate action, such as allowing more colours.

The software will only look for one kind of monitor and will stop looking when it finds one. Therefore it will ignore the other monitor even though it is connected. This problem will even occur with the desktop since it is just a very large example of a GEM program.

The overall problem therefore lies not with the hardware, which can handle two monitors, but with the software, which can't. You could go halfway and connect both monitors by a special cable, then turn one off and the other on when you wished to change resolution, but the ST would almost certainly crash, or lock-up, when you did this and you would have to reboot the system.

Printer problems

One problem that will crop up again and again with the ST is that of printer compatibility with both the ST and its software.

A. Poole of Gwynedd and Reg Williamson of Kidsgrove have both written to say that they are having problems with the free word-processor STWriter. This is a stop-gap meant to provide users with something until Atari releases the full GEM word processor in the near future.

In the meantime, however, many of you have had problems using non-Epson or Atari printers with STWriter.

Two which seem to occur most often are printing certain characters – such as £ – and using the printer's special capabilities such as condensed text.

Although I use an Epson printer with my ST, I believe the solution to the first of these problems is to include in your text a Control-O followed by the PRINTER code for the required character.

You may also need to send a Control-O sequence to change character sets beforehand.

The second problem can be solved by altering the file called "XYZZX.TXT" on your STWriter disc. Make a copy of the file on to another disc first and then load it into STWriter. The explanations following the *s are simply comment lines and tell you what immediately follows.

The necessary codes that must be sent to the printer to turn on the required mode then follow – a code for each line followed by a Return.

If you change the required codes and then save the file as you would normally, you should be able to use all of the features of your printer. If your printer has a certain feature that the Epson printers don't have, then you can replace one of the Epson code sets with one of your own.

For example, if your printer can change colour but doesn't have the Pica character size, then you can replace the codes for Enter Pica and Exit Pica to the codes for Enter Red and Exit Red. You would then use the Control codes for Pica in your files, but now they will change the print-out colour.

Hint section

If you have been opening and closing directories to find a particular program, you may like to know that you don't have to close the directory window every time you change discs.

First open a directory window as normal. Next change the disc in the drive and then press Esc once. The new directory will now be read in and will replace the old one on the screen.

End Bit

That's it for this month. Don't forget, if you've a question you'd like answered or you have a hint that you've discovered after many hours at the keyboard, then write to me at *Atari User*.

I also want to hear about the kind of ST articles you'd like to see in the future and what languages and other software and hardware you own.

● *Keep the questions rolling and I'll see you next month.*

WOOTTON COMPUTERS

PHONE FOR THE WEEK'S SPECIAL OFFERS!!

	Normal	Our Price
520ST 512k Computer + 3.5" Disc Drive 500k + Hi-Res Mono Monitor + 5 Disks	£749.00	£725.00
SF 314 Dbl sided 1 mbyte disc drive	£199.00	£179.00
10 Meg Hard Disk Drive	£499.00	£475.00
Atari 14" Med Res Col Monitor	£399.00	£369.00
Philips 14" Med Res Col Monitor		£299.00

ALL ST BUSINESS, GAMES SOFTWARE AND UTILITIES TO BE AVAILABLE AT THE LOWEST PRICES

130 XE 128k Computer	£169.99	£135.00
130XE + XCII Cassette Deck + Free Joystick	£211.98	£167.00
130XE + 1050 Disc Drive + Home Filing Manager + Pay Off Adventure + Games Master Disc (9.95)	£299.95	£255.00
XCII Program Recorder	£34.99	£32.00
1050 Disc Drive + DOS 3 + DOS 2.5	£129.00	£119.00

H.C.S. PERIPHERALS

1020 Printer/Plotter	£99.99	£79.95
Mannesman Tally MT 80 + (100cps)	£249.55	£219.95
1027 Letter Quality Printer	£250.00	£149.00
Mannesman Tally MT85	£469.00	£399.00
CX77 Touch Tablet + Atari Art Soft	£49.99	£29.00
850 Interface	£99.99	£89.95

SPECIAL SOFTWARE PRICES

Cartridges

Miner 2049er, Mountain King, Krazy Antics, Packman, Krazy Shoot Out, Centipede etc.

Cassettes

Blackjack, Pengon, plus many others.

Prices from £4.95.

All Atarisoft software available at discount prices. Please phone for full details of stocks.

EDUCATION/PROGRAMMING

Assembler Editor	£22.99	£20.99
Conversational French/or Spanish/or German/or Italian	£22.99	£15.99
Maths 'O' Level Course. Year 1-4	(cass) £9.95	£12.95 (disc)
Maths 'O' Level Course. Year 5 Revision	(cass) £9.95	£12.95 (disc)

HOME/BUSINESS

Superscript Word processor	£99.00	£69.00
Typesetter	£34.95	£29.95
Homeword (Sierra word processor)	£48.95	£46.95
Magiprint	£25.95	£23.95
Databyte Graphics Art Dept.	£29.99	£28.99
Home Filing Manager (disc)	£24.99	£14.99
C.D.C. Discs (SS/DD) 10 in box		£16.99
Memorex Discs (SS/DD) 10 in box		£19.99
Maxell Discs 10 in Library Case		£19.99
Blank Cassettes 10 of C20		£5.00
Unibox Holds 80 Discs		£10.95
"Wood" Style Disc carrier for 60 discs		£16.95
U.S. Doubler	£79.99	£76.99
Joysticks	£7.99	£7.00
Joystick Inserts (repair kit)		75p each
Paddles	£9.99	£9.00

Full range of Books, Monitor and Printer Interfaces and Leads.

½ your disc costs use the B side. Disc Notcher £5.99

All Subject to availability. All prices inc. VAT P&P extra please enquire.

116 EDLESTON ROAD, CREWE, CHESHIRE. 0270-214118

PHONE FOR THE WEEK'S SPECIAL OFFERS!!

STRATEGIC PLUS SOFTWARE

SPECIALISTS IN QUALITY COMPUTER GAMES FOR THE DISCERNING GAMER.

STRATEGY, ADVENTURE AND SPORTS GAMES FOR THE ATARI 800 SERIES AND ATARI 520ST COMPUTERS.

Send for our free 20 page '85/'86 catalogue, which has a large-selection of titles, with descriptions and complexity ratings for each game.

All gamers who place orders or receive our catalogue will be eligible for our quarterly newsletter, updating our catalogue and keeping you in touch with up and coming titles.

NEW TITLES COMING SOON:

ATARI 800 Series: Star Fleet – Sci-fi role playing game.

ATARI 520ST: Flight Simulator II – Jet – Sundog – Phantasie – Universe II

Atari 800, XL, XE

STRATEGY/WARGAMES

Battalion Commander	£35.00
Panzer Grenadier	£35.00
Antietam	NEW £49.00
U.S.A.A.F.	NEW £49.00
Kampfgruppe	£49.00
Colonial Conquest	£35.00
Chickamauga	£31.00
Rommel: Battles for Tobruk	NEW £43.00
Napoleon at Waterloo	£31.00
Crusade in Europe	£35.00
Clash of Wills	NEW £35.00
Silent Service	NEW £35.00
Kampfgruppe Scenario Disc NEW	£15.00

SPORTS

Computer Baseball	£35.00
Computer Quarterback	£35.00
Micro League Baseball	£35.00

All Programs are on Disc only

Call us on:
01-979 2987

Or write to:
Strategic Plus Software, P.O. Box 8, Hampton, Middlesex TW12 3XA.

Business Hours:
10am-6pm Mon-Fri.
11am-4pm Sat.

Please make cheques payable to: Strategic Plus Software.

Interactive fiction games from **INFOCOM**

Atari 800, XL, XE + Atari 520ST.

Brattacas Atari 520ST	£35.00
A Mind Forever Voyaging (520ST only)	£38.00
Cutthroats	£30.00
Deadline	£38.00
Enchanter	£38.00
Hitchhikers Guide to the Galaxy	£30.00
Infidel	£38.00
Planetfall	£38.00
Seastalker	£34.00
Sorcerer	£38.00
Starcross	£34.00
Suspect	£38.00
Suspended	£38.00
Wishbringer	£35.00
Witness	£38.00
Zork series (I, II, III)	EACH £34.00

All prices include Postage and Packing + VAT

HOME VIEW

ATARI AT HOMEVIEW VIDEO

ATARI 400, 800, 600XL, 800XL, 130XE, 520ST

(Callers Welcome)

SOFTWARE

	Cass.	Disk
Drop Zone	£9.50	£13.95
Colossus Chess	£9.50	£12.50
Quasimodo	£9.50	£14.50*
F15 Strike Eagle	£14.50	£14.50
Blue Max 2001	£9.50*	£14.50
New York City	£9.50*	£14.50*
Ghostbusters	*	£14.50
Conan	N/A	£14.50
Mr Robot	N/A	£14.50
Mr Do	£9.50	*
Bounty Bob Strikes Back	£9.50	*
International Karate	£6.50	N/A
The GT American Road Race	N/A	£14.50
Chop Suey	£8.50	£12.50
Super Zaxxon	£9.50	£14.50
Rescue on Fractulus	£9.50	£14.50
Hacker	£9.50	£14.50
Ballblazer	£9.50	£14.50
Seven Cities of Gold	£9.50	£14.50
Music Construction Set	N/A	£14.50
Pinball Construction Set	N/A	£14.50
Ultima III	N/A	£19.50
Hulk	N/A	£15.95
Spiderman	N/A	£15.95
Mercenary	£8.50	£12.50
Koronis Rift (Release 22nd Dec)	Phone	Phone
Eidolon (Coming soon)	Phone	Phone
D.Bug	*	£12.50
Elektra Glide	£8.50	£12.50
Synfile	N/A	£49.95
Syncalc	N/A	£49.95

We cannot list all the items we stock

Plus Miner 2049er, Oils Well, Decathlon, Pitfall II, Space Shuttle, Tennis, B.C.'s Quest for Tires, Drelbs, Bruce Lee, Pole Position, Fort Apocalypse, Solo Flight, Boulder Dash, etc.

* = Coming soon

Atariwriter Disk coming soon 1000's more titles available

Dealer for COMPUTER SUPPORT

XOS	Phone for details
XOS 80 Column	Phone for details
XOS Ultimon	Phone for details
Tripler Board for selecting different operating systems	Phone for details

Blank Discs .... £12.95 for 10
Hub Rings Guaranteed, notched for double sided use

DOS 2.5 Send Disk + 50p for FREE COPY

AUTO LABELLER FOR EPSON PRINTER

For DOS 2, 2.5, 3, Long John DOS, Multi Boot etc. Plus mailing labeller just £9.95

HARDWARE

Touch Tablet	£29.00 + P&P
130XE	£125.00
130 XE Starter Pack	£165.00
130XE + Disk/D Starter Pack	Phone for details
1050 Disk Drive	£129.00
520 ST in 3 new packs	Phone for details of best prices

PRINTERS, INTERFACES ETC. ENQUIRIES WELCOME

PROBLEMS

CALL IN OR PHONE WITH ANY PROBLEMS
FOR FRIENDLY ADVICE REGARDLESS OF WHERE PURCHASED

PHONE ORDERS SENT SAME DAY – OPEN 7 DAYS A WEEK –
Mon, Tues, Wed, Fri and Sat Open till 8.00pm
24 HOUR ANSWER SERVICE

Prices include VAT and FREE P&P – Overseas orders welcome

VISA

Call for Best Prices
CREDIT CARD HOT LINE
01-691 0207

RING **HOMEVIEW** NOW
296 BROCKLEY RD, BROCKLEY, LONDON SE4 2RA

TIME 02:45.30 PM

Make time for a time check

By PAUL LAY

THIS program provides an interrupt driven 12 hour clock which will appear in graphics Mode 0 at the top right hand corner of the display.

In other modes it will be displayed at the top right hand corner of the text window if one is present.

The clock is constantly displayed but will be momentarily destroyed – for 1/50th of a second – by any screen scrolling. It is protected against the system reset key but pressing this key results in the loss of a second or so.

It is possible to turn the clock display off by POKEing a zero to location 1789 and it can be turned back on by POKEing any other value.

Once the clock has been set it can be reset by running this program again and the user may continue normally. The only point to watch is that page 6 is not used as the clock routine is stored here.

VARIABLES

TEXT$	Indicates AM or PM.
CHECKSUM	Validation check on machine code data.
LOCATION	Loop over locations used by machine code.
CODE	One item of machine code.
HOURS	Hours.
MINS	Minutes.
SECS	Seconds.
HI	First digit of hours/mins/secs.
LO	Second digit of hours/mins/secs.

```
10 REM Atari VBI Driven Clock
20 REM for Atari User Magazine
30 GRAPHICS 0
40 DIM TEXT$(2)
50 ? :? "Atari VBI Driven Clock"
60 ? "by Paul Lay"
70 IF PEEK(1536)=32 AND PEEK(1664)=201
 THEN 290
80 REM ---set up machine code---
90 CHECKSUM=0
100 FOR LOCATION=1536 TO 1789
110 READ CODE
120 POKE LOCATION,CODE
130 CHECKSUM=CHECKSUM+CODE
140 NEXT LOCATION
150 IF CHECKSUM=36016 THEN 190
160 ? :? "Error in data statements :"
170 LIST 530,890:STOP
180 REM ---mask System Reset key ---
190 IF PEEK(9)=1 THEN 240
200 POKE 2,5
210 POKE 3,6
220 POKE 9,2
230 GOTO 290
240 POKE 1537,PEEK(12)
250 POKE 1538,PEEK(13)
260 POKE 12,0
270 POKE 13,6
280 REM ---input the time---
290 ? :? "Enter the time :":?
300 ? "Hours (1-12) ";
310 TRAP 300:INPUT HOURS
320 IF HOURS<1 OR HOURS>12 THEN 300
330 ? "Minutes (0-59) ";
340 TRAP 330:INPUT MINS
350 IF MINS<0 OR MINS>59 THEN 330
360 ? "Seconds (0-59) ";
370 TRAP 360:INPUT SECS
380 IF SECS<0 OR SECS>59 THEN 360
390 ? "AM or PM ";
400 TRAP 390:INPUT TEXT$
410 IF  NOT (TEXT$="AM" OR TEXT$="PM")
 THEN 390
420 REM ---set the clock---
430 HI=INT(HOURS/10):LO=HOURS-10*HI
440 POKE 1780,LO+144:POKE 1781,HI+144
450 HI=INT(MINS/10):LO=MINS-10*HI
460 POKE 1777,LO+144:POKE 1778,HI+144
470 HI=INT(SECS/10):LO=SECS-10*HI
480 POKE 1774,LO+144:POKE 1775,HI+144
490 POKE 1769,ASC(TEXT$)+96
500 I=USR(1540)
510 END
520 REM ---machine code data---
530 DATA 32,255,255,72,104,173,148
540 DATA 2,133,203,173,149,2,133
550 DATA 204,160,176,162,6,169,6
560 DATA 32,92,228,96,162,144,238
570 DATA 235,6,238,235,6,173,235
580 DATA 6,201,154,208,92,142,235
590 DATA 6,238,236,6,173,236,6
600 DATA 201,154,208,79,142,236,6
610 DATA 238,238,6,173,238,6,201
620 DATA 154,208,66,142,238,6,238
630 DATA 239,6,173,239,6,201,150
640 DATA 208,53,142,239,6,238,241
650 DATA 6,173,241,6,201,154,208
660 DATA 40,142,241,6,238,242,6
670 DATA 173,242,6,201,150,208,27
680 DATA 142,242,6,238,244,6,173
690 DATA 244,6,201,154,208,6,142
700 DATA 244,6,238,245,6,201,146
710 DATA 240,5,201,147,240,27,96
720 DATA 173,245,6,201,145,208,248
730 DATA 173,233,6,201,161,240,6
740 DATA 169,161,141,233,6,96,169
750 DATA 176,141,233,6,96,173,245
760 DATA 6,201,145,208,222,142,244
770 DATA 6,238,244,6,142,245,6
780 DATA 96,32,25,6,173,253,6
790 DATA 240,43,173,191,2,201,24
800 DATA 240,11,165,203,133,205,165
810 DATA 204,133,206,76,214,6,165
820 DATA 87,208,21,165,88,133,205
830 DATA 165,89,133,206,162,22,160
840 DATA 17,189,230,6,145,205,200
850 DATA 202,16,247,76,95,228,0
860 DATA 128,173,161,128,144,144,142
870 DATA 144,144,142,144,144,154,146
880 DATA 145,128,229,237,233,180,128
890 DATA 0,1
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	6557	20	6662	30	2039
40	2120	50	6799	60	3705
70	7732	80	6987	90	2150
100	4678	110	2023	120	3792
130	4576	140	2960	150	4699
160	8720	170	3429	180	7746
190	3621	200	1550	210	1556
220	1552	230	1637	240	3356
250	3364	260	1770	270	1803
280	5755	290	5907	300	3219
310	4341	320	5898	330	3783
340	4236	350	5544	360	3740
370	4201	380	5564	390	2566
400	4337	410	7571	420	5560
430	6119	440	5952	450	5808
460	5996	470	5766	480	5975
490	4277	500	2027	510	836
520	6839	530	4739	540	4455
550	4448	560	4794	570	4519
580	4726	590	4189	600	4728
610	4500	620	4765	630	4488
640	4750	650	4501	660	4249
670	4689	680	4488	690	4456
700	4491	710	4444	720	4752
730	4424	740	4778	750	4732
760	4742	770	4166	780	4028
790	4451	800	4812	810	4725
820	4729	830	4772	840	4669
850	4246	860	4999	870	5007
880	5027	890	1480		

Let's GET it right, VAL is not guilty

I NOTE that in Mike Rowe's documentation for his Computer Countdown program in the December 1985 issue of Atari User, *he reports that he found a bug while using his version A Basic cartridge which he attributes "to the VAL() function which apparently does not operate correctly after using it once".*

I would like to clarify the actual cause of this problem. The VAL function is not at fault.

The culprit is in fact the GET command. Bill Wilkinson, of Optimized Systems Software, identifies the problem in "The Atari Basic Source Book" from Compute! Publications.

The GET statement does not reinitialise its buffer pointer, resulting in corruption if used after a statment which has changed the system buffer pointer.

In Mike's program the subroutine at line 300 contains a GET (at line 310) followed by a VAL (at line 340).

The first time through there's no problem, the buffer pointer has not been changed prior to the GET, it changes when the VAL is first executed.

However on subsequent calls to the routine GET will not reinitialise the buffer pointer and the result is that VAL apparently corrupts the input.

Mr Wilkinson suggests a simple solution of using a statement such as DUMMY$=STR$(0) or PRINTing any number before executing the GET.

Either of these statements correctly resets the buffer pointer. Another solution is to use the statement X=USR (ADR("hLQZ")) (Z is INVERSE) which effectively JSRs to the buffer initialising routine in the floating point ROM package which GET omits.

Incidentally, LOCATE has similar problems, as this statement calls GET.

The bug was present in Atari Basic Rev A (the original cartridge) but was corrected in the later B and C revisions.

The version of Basic can be determined by PEEKing location 43234. Rev A gives 162, Rev B gives 96 and Rev C gives 234.

One last comment on Atari Basic. I presume all these 800XLs which are currently being offered in bargain packages contain the Rev B Basic with its built-in bugs (the infamous 16 byte addition to each SAVE...).

I hope Atari or someone is notifying purchasers of these XLs that the bugs exist and ways around them.

It's all well and good to grab a larger slice of the market, but not if you end up with a number of complaints about the product.

If the Rev B problem, and its solutions, is not clearly identified then the Hotline and shops are going to get plenty of questions.

I wonder how many people in Boots, Laskys and Dixons can explain the situation?

Finally congratulations on the continued publication of Atari User. *I look forward to new series replacing the concluding graphics and display list articles.*

Would it be possible to print a regular, comprehensive user group listing?

Mentions of one or two groups have been made in the Mailbag, but I'm sure it would be beneficial for all Atarians to see a detailed list.

I'm certain there are many who are looking for local groups and would welcome such a page. – **Allan J. Palmer, Basingstoke.**

● Thanks for the information on the GET command.

We hope to publish a comprehensive list of user groups in the future.

Your fears about the Basic included in the "bargain" 800XLs may or may not be well founded, we can't say at the moment.

Certainly some recently acquired 800XLs in our office all arrived with Rev C Basic, so let's hope the bargain machines are similar.

The Bells

I GIVE up! I thought I knew my 800XL keyboard, but try as I may I can't produce the special character on line 9702 of your Esmerelda game in the January issue.

Just what is that first item of data? It's certainly given me the hump! – **Greg Barton, Crawley, Sussex.**

● The offending character should be a 4, and once again we plead innocence. The original artwork was perfect (of course) and the glitch occurred in the printing process.

We're mixing the sand and cement for the printer's overcoat at this very minute, but apologies to all frustrated bell-ringers.

Limited on-screen editing

I WOULD like to see something more educational for my children in Atari User, *also ideas on putting and getting characters on graphics screens.*

In the December 1985 issue, you talked about the infamous math lock-up. Well being a sufferer of this problem for about 11 months I was concerned about the guarantee running out on my 800XL so I telephoned the Atari dealer in SE England who sold it to me.

I was told that this problem occurred if one did too much on-screen editing.

I read the article from your magazine, but no offer was made to change anything.

I was told it was a design fault and that it was difficult to cure. I would have to live with it.

As I try to write a lot of programs and invariably get them wrong, I do a lot of on-screen editing. I therefore felt this was not a very satisfactory answer.

I decided to telephone the Atari Help line. They confirmed that there was a problem, but again no offer was made to change anything.

What they did offer was that if I sent a disc or cassette to them they would put on it for me Basic Revision C software, which would help solve the problem.

They did also mention an alternative answer – the purchase of Basic XL which would also solve the problem. – **R.J. Hodgkins, Gillingham.**

Loading technique

I RECENTLY bought an Atari 800XL with a recorder and quite a number of tapes and software.

From the beginning I had trouble loading most of my programs, and thinking my recorder was at fault I took it back to the shop and had it replaced.

I still find that I cannot load any cassette, no matter how closely I follow the instructions given in the Atari manual or those given with any individual cassette.

I can't understand this, as I

→

now have a new recorder and I don't think my computer is at fault as I have carried out all the audio and visual tests and everything appears to be in perfect working order.

Every cassette I load gets as far as the "ready" stage but as soon as I press play on my recorder and Return on my computer I get "BOOT ERROR" and "MEMORY TEST" on the screen.

This happens with every one of my numerous cassettes and I am just about ready to smash the lot against the wall. I hope you can help me. – **Patrick McDonald, Lisburn, Co Antrim.**

● It sounds as though you are trying to load commercial tapes, many of which require Basic to be "locked out".

Although the loading instructions may tell you to hold down START when you switch on the machine, with an 800XL you often need to hold down START and OPTION. Try this with a few tapes – it may save you having to re-paper the wall!

Getting in touch

CONGRATULATIONS on your magazine, particularly the beginners section.

I recently bought an 800 XL and disc drive and I appreciate the monthly disc.

My first attempt at typing in a long program, Maze Munch took nearly six weeks to debug (all my own typing errors).

I would be very interested if you could publish addresses of user groups, as although I sent off my guarantee registration cards I have heard nothing from Atari, which I gather is not unusual.

I would really like to contact a group, and particularly other users in the North Gwent area.

With regard to Dean Rossitter's letter in November, and your comments on writing an article on plugging the Atari into the outside world. Yes, yes, yes please! – **Ian McNicholas, Ebbw Vale.**

● We don't know of a user group in the North Gwent area – perhaps one of our readers knows of one.

Reason for the error

I TYPED in the program Canvas on my Atari 800XL, from your October magazine.

When I tried to run the program it went to the graphic screen and printed "Error 8 at line 2070".

Please can you tell me what is wrong with the program? – **Robert Harvey, Cowplain, Hants.**

● Guess what – you've made a typing error somewhere, probably between lines 2070 and 2120.

Books for beginners

I WOULD like to know if Ocean are thinking of bringing out Street Hawk and D.T. Supertest, also could you recommend a good book for the beginner?

Could you please tell me if my 800XL is OK? After I have saved a program a high pitched tone keeps going until I reset or press END. – **M. Fryer, Wednesfield.**

* * *

COULD you give me the title of a book on how to use Atari Basic from the start, or where to get tuition on the subject.

I was not able to get to grips with the Atari manual and subsequently I have not been able to use my micro to best effect.

Could you tell me if Zoomsoft supply the software with Touch Tablet as it does not say anything about it in the advert in Atari User. – **Alan McGill, Maidstone.**

● There is no problem if a machine carries on the high pitched tone after saving. Just hit Reset or type END – or use a SOUND statement – and it will go away.

The Touch Tablet comes as standard with the Atari-Artist cartridge, allowing you to use it to the full.

If you bought the package with the 1020 printer you also get a program which will allow you to get a paper print out of your masterpieces in four colours.

This package has only recently become available again, and is excellent value for money.

There have been a number of requests for good books for starting to program on Atari computers, possibly because of the poor manuals sent out with the XL range.

There are dozens of books available, but you could do a lot worse than looking out the following titles:

The XL Handbook (Century Publications) £6.95: A good book to take you from first steps up to some quite advanced topics.

Easy Programming for the Atari Micros (Shiva) £6.95: A similar book to the above, but covering less ground when it comes to the more advanced sections.

Your Atari Computer (Osborne/McGraw Hill) £16.95: A superb book for someone who has perhaps mastered the very first steps, and wants an excellent tutorial/reference book with lots of information on all aspects of Atari programming. A must for the serious programmer.

Watsons Notes on the Atari (Glentop Publishers) £2.95 each: A series of six very reasonably priced books starting from first steps and moving eventually up to player/missile graphics, etc.

The full range consists of:

1) First steps in Basic.
2) Exploring Basic.
3) Making Basic work.
4) Creative graphics.
5) Advanced programming.
6) Journey into memory.

However if YOU have seen, or purchased, a book which you think other readers would find useful, why not write in and let everyone know about it.

The same applies, of course, if you found that a book didn't help you with what you thought it would.

Hunting tigers

I WRITE in response to the letter published in the December issue from C.R.J. Sunman regarding Tigers in the Snow.

My local Atari dealer Ordem, has this title for £14.95, that's the same price as the CBM64 and some £25 cheaper than Mr (or is it Ms) Sunman talked about.

I bought a copy myself and am very pleased with this excellent strategy game – Apple version one side of disc, Atari version the other. – **Mrs L. Prestidge, Reading.**

● The game also appears in the latest Silica Shop list as a US Gold release at £14.95 for cassette or disc.

Basic experience

I WAS sorry to hear that some of your more experienced readers objected to space being used for beginners.

Well, I'd just like to say, we're not all budding geniuses and being an ignorant housewife I find it very beneficial.

Also my children, who are four and five years old can learn to type in with these Basic small programs.

In fact they are very good now with all the keys of the keyboard and are enjoying doing these short lists.

So give a thought for the future generations of computer users. – **Euphemia Hain, Livingston.**

● Don't worry, we intend to continue catering for as wide a range of users as possible.

Hard on gerbils

IN the August 1985 issue of Atari User *there was an article concerning the Ocean game Frankie Goes to Hollywood, which told us how great the game was going to be when it was released in "late summer".*

Well summer has come and gone – I think – and the game hasn't made an appearance in Atari format anywhere, Although it's been out in other formats for ages.

Where is it? I want to buy it. I've played the Commodore

version and it's great. Even the Spectrum version is very good.

Considering the Atari's superiority over these two machines its version should be a real cracker.

Another much advertised game which has not yet appeared in Atari format is System 3's International Karate, which, according to the first adverts was supposed to be released in mid-August. I don't see it anywhere, do you?

If you don't tell me where it is, I'll eat my gerbils. – **A. Veryannoyedperson, Newcastle.**

● Our advice is to sauté them lightly and serve in a white wine sauce.

Bridging the gap

I KNOW not where or to whom I should write to express my disappointment.

Last April I purchased a 130XE with the assurance that software for bridge was available. This has never been forthcoming.

Why do I see many games which I am sure can not be big sellers, whereas bridge is one of the most popular games in the country with far more participants than chess.

Many hotels hold bridge weekends throughout the year. Evening classes certainly in my area are over-subscribed.

Even the BBC has produced its own £200 computer devoted to the game.

I would be grateful if you could help me with the right contacts. – **A.G. Formoy, Orpington.**

● We don't know of a commercially produced package, but turn to Page 32 for the *Atari User* Bridge program.

Canadian contact

BEING a native of England, and an imigrant to Canada for 13 years, I was most pleased to receive my first issue of

→

All in the same boat...

WE were interested to read G. Whittaker's letter in the September issue of Atari User about the difficulties he is having with his Atari.

We were unable to get our Atari to work correctly when the memory module was attached, yet the computer worked perfectly well on its own.

As the memory was under guarantee we sent it to Slough for attention and it was sent back to us after checking.

Still the two would not work correctly together, so we sent it all to the recommended Atari repairers, Mastercare of Maidstone who returned it saying all was in order. But on trying it we not only found it still had the original faults but quite a few more as well!

We sent it back immediately but since then have been told each time we enquire that they have not been able to get the parts. Surely if the computers are still being made somebody somewhere must have parts.

Is it wrong to presume that the recommended repairers can mend a computer and not make more faults – five months seems to me an exceptionally long time, and then to tell the customer to be patient or take it elsewhere for repair after their mechanics have fouled it up! – **Mrs A.O. Iles, Ashford.**

★ ★ ★

ON reading G. Whittaker's letter, I feel I must agree with him. I own a 800XL, 1020 printer, 1100 recorder and touch tablet. Just recently I bought a 1050 disc drive.

On getting my newly acquired 1050 home imagine my horror on opening it up to find the 1050, leads and transformer there, and that was all.

I went back to Laskys, who said that there should be manuals and a DOS disc. I asked if they could take them from another box, but in each one opened the instructions were in German.

They suggested I write to Atari at Slough which I have now done three times, and each time, as in Mr Whittaker's case, silence or plain ignorance.

I think before Jack Tramiel boasts about backing all existing ranges and new launches and the like, he should put his UK house in order.

I have been so disappointed over this that I have convinced the 17 members of our local user group that if things don't pick up with Atari we had better consider going over to Commodore, as a last resort.

Over the years I have grown to love Atari but recent events are making it hard for me to get excited about Atari's future prospects. – **J.B. Dray, London W19.**



★ ★ ★

YOU are right G. Whittaker of Swinton, you are not the only one with difficulties with Atari UK.

Some time ago I sent a letter about vertical lines covering the screen display of my 130XE asking whether it was my machine at fault or whether it isn't compatible with my Philips TV – and I'm still waiting to see if it can be fixed. – **A. Bozward, Worcester.**

★ ★ ★

I WAS not surprised to read of D. Whittaker's account of his dealings with Atari UK. There must be dozens of people in the same boat.

I am a midwifery tutor and as yet in all but one or two schools, computers do not feature in our educational techniques.

However tutors all over the country are very keen to know how and where computers could be put to good use in midwifery and nursing education.

Being an Atari owner and battling with Basic at present so that I can write my own programs for our student midwives, I read with interest in your magazine that Atari are offering a discount on their hardware to educational establishments.

I believe that Atari without the discount offers good value for money, therefore being a good samaritan I wrote to Atari UK and informed them of this very large virgin territory in midwifery and nursing schools.

Companies selling the BBC B already know that they have a large untapped pool of budget holders and I know of at least two firms who are trying to make inroads into this market in my area alone.

We have regular regional meetings where an Atari representative could have demonstrated the computer's uses to about a dozen budget holders at once.

Did they acknowledge my concern for them? No fear. I have not as yet so much as received a reply. In fact the sheer rudeness caused me to invite a firm selling the BBC B to come to our school and demonstrate that computer's potential.

When a few schools purchase computers the others will follow suit and probably with the same make so that there can be interchange of software. So Atari beware, there is a section of the market that you are ignoring at your cost. Computers are bound to mushroom into offices and ward areas in hospitals throughout the country. The hospital classroom is one foot in the door. – **Mrs Jackie Paddison, Eggborough, Goole.**

Atari User, compliments of my English relatives.

I must say first and foremost well done on a fine magazine, I was most impressed with the layout. Your articles make excellent reading, also your type-in programs are unique, which brings me to the reason for writing this letter.

I am a member of MACE (Michigan Atari Computer Enthusiasts) group, I am also the disc librarian and program coordinator for my local Atari group ERACE (Essex Regional Atari Computer Enthusiasts).

I would like to correspond with any Atari user group in the UK or individual who would like to exchange ideas and public domain programs with our group.

At present our membership is around 150 and growing, our library consists of approximately 50 discs all public domain and 100 MACE discs.

We would also like to trade new and interesting programs for the 520ST public domain.

Anyone or group can write to us care of myself at the address below. – **Harold Warne, 2630 Reddock Avenue, Windsor, Ontario, Canada, N9E 4J4.**

ATARI USER Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

Taming the printer

MY 1020 printer will print standard upper and lower case from a command from Atari Writer and Home Filing Manager.

But I cannot access the character widths, set, character, etc as described in the manual.

Please what am I doing wrong? My age is 65 (old codger). I do know a younger man (30ish) who sells TVs and micros and he is having the same problem.

A second problem. We are encouraged to make a working disc of DOS, but when I tried to make a working copy of my Home Filing Manager I cannot.

I get "Format incompatible" using DOS 2 or 3. However using Atari Writer I have been able to list and print the files, but giving 000 sectors used and 000 unused.

EMI programs Billiards, Cribbage etc made for the 400 and 800 models, when loading into XL models they stop after loading the first part.

What happens is the first part loads then the TV screen flashes and then crashes. To overcome this as soon as the TV flashes press Reset then the program continues to load normally. I discovered this by experimenting.

I am now converting my daughter to Atari and she is putting her Sinclair Spectrum (cannot get on with it) up for sale. – **E.C. Jones, Gillingham.**

● You might find that the problem is one of shifting between modes. If you check the 1020 manual, you will find the best way to access the extra modes is to go into Graphics Mode (ESC ESC Ctrl-G), then change the size, etc by following the manual, and try a sample by sending a line such as:

P (Text goes here . . .)

The P tells the Graphics Mode that some text to print follows, not more Graphic commands. Afterwards, you can quit Graphics Mode by using command 'A', and send normal text again.

By the way, don't forget that your commands must be the first thing on a line, they cannot come after some text.

Most commercial discs are protected against home copying to avoid the potential problem of piracy.

However unless badly treated, a disc should last an awfully long time, so you shouldn't really need to copy it.

If your disc does go faulty your dealer should be able to replace it very quickly.

Good luck with converting the rest of your family to Atari! It's nice to find we have such a wide age range in our readership.

Mystery command

I BOUGHT an Atari 800XL a year ago last December and on looking at some coloured pamphlets, pretending to be instructions, was disappointed at the feeble effort which Atari had put into explaining their machine.

I hoped that the computer would not be so useless, and luckily it was not.

I have now figured out how most of the main commands work, but there are still some lesser known ones which I have never seen before.

A fellow Atari user mentioned the XIO command. He said it was used to fill shapes in, but neither he nor I know how it works, how to use it or even if there is such a command. I hope you can help. – **C. Macdonald, Paisley.**

● Yes, there is an XIO command. It's a general input/output command which can be used to fill an area of the screen between plotted points and lines.

A typical example might be:

```
XIO 18,#6,0,0,"S:"
```

The 18 is the part which is needed for a fill operation – replace this with 12 and it performs a CLOSE operation instead.

For an example of its use, see the Microscope program on page 50 of our November issue.

Directory reader

ATARI USER, along with other magazines, often reminds us, and quite rightly, that when writing to advertisers for information about their products we should enclose an SAE if we want a reply.

I wonder if you could remind advertisers that if they are sent an SAE then a reply is expected.

If they don't reply they can be sure that they have lost a sale, as there are only two reasons for not replying – they are no longer trading or they are not interested in selling their products, which is strange if they are paying for adverts in magazines.

On a more constructive note, the DOS directory reader, December Mailbag, can be performed much quicker by typing in direct mode:

```
DIM A$(20):OPEN #1,6,0,"D:*.*":FOR B =1
TO 65:INPUT #1;A$:? A$:NEXT B
```

This can be done at any time without affecting the program in the machine. The directory list will end with an Error 136 (end of file) which can be ignored.

If you have already used A$ in your program you will get Error 9, so leave out the DIM or do a CLR first. – **P. Boulter, Twickenham.**

Auto-boot tapes

I STARTED to load in Get

Knotted from the October 1985 Atari User *but had to stop for lunch. So I decided to put what I had printed so far on to a blank tape – a Boots C15 computer-cassette.*

But after loading it, an Error 139 message came up on the monitor.

I would like to know what an Error 139 means and what I am doing wrong as I followed the instructions out of the Atari 1010 program recorder owner's guide. – **Gareth Lowe, Cowbridge.**

● Error 139 is Device NAK, which doesn't mean quite what it sounds like! Rather, it means that the device with which the micro is trying to communicate isn't acknowledging.

Make sure the power is getting to the recorder (is the light lit up?) and that the cable from the micro to the recorder is firmly pushed home at both ends.

With your program in memory, press Record and Play together, type CSAVE and press Return twice.

This should save the program, which can later be loaded back in using CLOAD.

Cheaper RAM pack?

I AM the unfortunate owner of an Atari 600XL. I say unfortunate because I only bought the damn thing just over two years ago, before the 800XL was released, in the full anticipation that the promised expansion RAM pack would be available early in 1984.

I have not only seen the price of Atari drop to £165 for Atari 800XL with disc drive I've seen the 600XL disappear without a trace.

So I am now fully resigned to leaving the Atari name and changing, dare I say it, to Commodore.

But before I take this painful step – one last chance, can somebody tell me how I get my hands on an Atari 600XL expansion RAM pack?

Or better still, come on Jack, let's have a RAM pack offer with free software for £60 or less to show those who had faith in Atari when in the doldrums that it was not misplaced. – **J.B. Giscott, Bideford.**

More on utilities

CONGRATULATIONS! For the first time that I can remember you have reviewed a utility, in Stephen Donoghue's excellent little article on Basic XL (December 1985).

Of course, as with other Atari software, the sting comes in the tail with the usual exorbitant price, "£75 or so", but that is Atari's fault, or the software house's, not Mr Donoghue's.

We normally get reviews of four games in Atari User, but in the 1985 December issue we had no less than 14 games reviewed, if you count Brillig's Adventuring article.

Utilities, business and educational software gets scant attention by comparison. May I make a suggestion that you make a New Year resolution to put this imbalance right, and in future issues divide your software reviews equally between games and the non-games software?

Beginners like me haven't a clue which non-games software is worth looking at. Most of them are just names to us, and we would like a lot more information on what they do so that we can decide whether or not to buy.

Take a look through the lists of your advertisers to see just how little information is provided – and of course, they are biased. We do need impartial reviews on non-games software, please.

Perhaps Jack Tramiel & Co should be looking at getting software prices reduced, as well as the hardware? Even if you can afford it, Atari software is a real pain to find – unlike other popular makes of computer.

May I confirm what some of your other readers have said about the failure of Silica Shop to provide an information mailing service, as advertised.

I bought my 800XL and peripherals in March 1985, and I am still waiting for my first information sheet.

When you phone them they tell you that there have been delays, or words to that effect.

This is simply not good enough – they should stop advertising this service if they cannot provide it.

With production of the 800XL now coming to an end, I hope that Atari User will still cater for the 800XL owner for some time to come, and not get carried away with enthusiasm for the new machines at least until owners of the older machines have up-dated their hardware.

Hopefully as the new machines become more plentiful, retailers will start to offer worthwhile trade-in deals to encourage owners of older machines to update.

Otherwise I can see the market becoming saturated, with no movement of the new machines.

How about a dustcover for the 800XL like the one for the 130XE?

Best wishes – keep up the good work. Atari User is improving all the time. – **C.H. Tedman, Westgate-on-Sea.**

● To a large extent we rely on software being sent by the manufacturers for review. Since most of the software released is games, the review pages reflect this.

We produce a dust cover for the 800XL – see Page 61.

York group

We are a group of Atari enthusiasts in and around York setting up a user group.

I would be grateful if all people interested in joining would, in the first instance contact me on York 708391 or at the address below. – **J.P. Nelson, 10 Dringfield Close, Dringhouses, York YO2 2TQ.**

Not-so-smashing hits

I HAVE a problem with Smash Hits volume 1. It has suddenly decided that it is not the original version and when it boots it cannot get past the stage where it searches for its bad sector.

I have a feeling that it is my disc drive's speed even though I can still access my old files from when I first bought my Atari about three years ago.

I am a Christian and have designed my alternate (very alternate) version of Pacman. It involves you running around the church collecting up the hymn books after the service.

The pews make up the maze and devil-shaped characters chase you around the screen. Of course there were Bibles scattered around the maze so you could chase the devil away with scripture.

The first time I typed my program into my Atari 800 it locked up just as I typed in the SAVE command – it locked mid sentence, not after I had pressed Return.

The second and third times I typed it in the same thing happened. The fourth time however – 10 very sore fingers later – I saved the program every 10 minutes.

However when it came to save the final version the computer started its save and then stopped after about two seconds leaving me with all the pretty colours my computer usually saves for when I can't get a display list to work properly.

I came to the conclusion that someone didn't want me to finish this program. – **Matthew Sims, Epsom.**

● You could have a drive speed problem – in which case have the drive tested by an engineer. It should be 288.5 rpm, or thereabouts.

Also the disc could be faulty, which you can check by trying it out on a friend's machine or at a friendly local shop.

ATARI USER *is looking for new writers.*

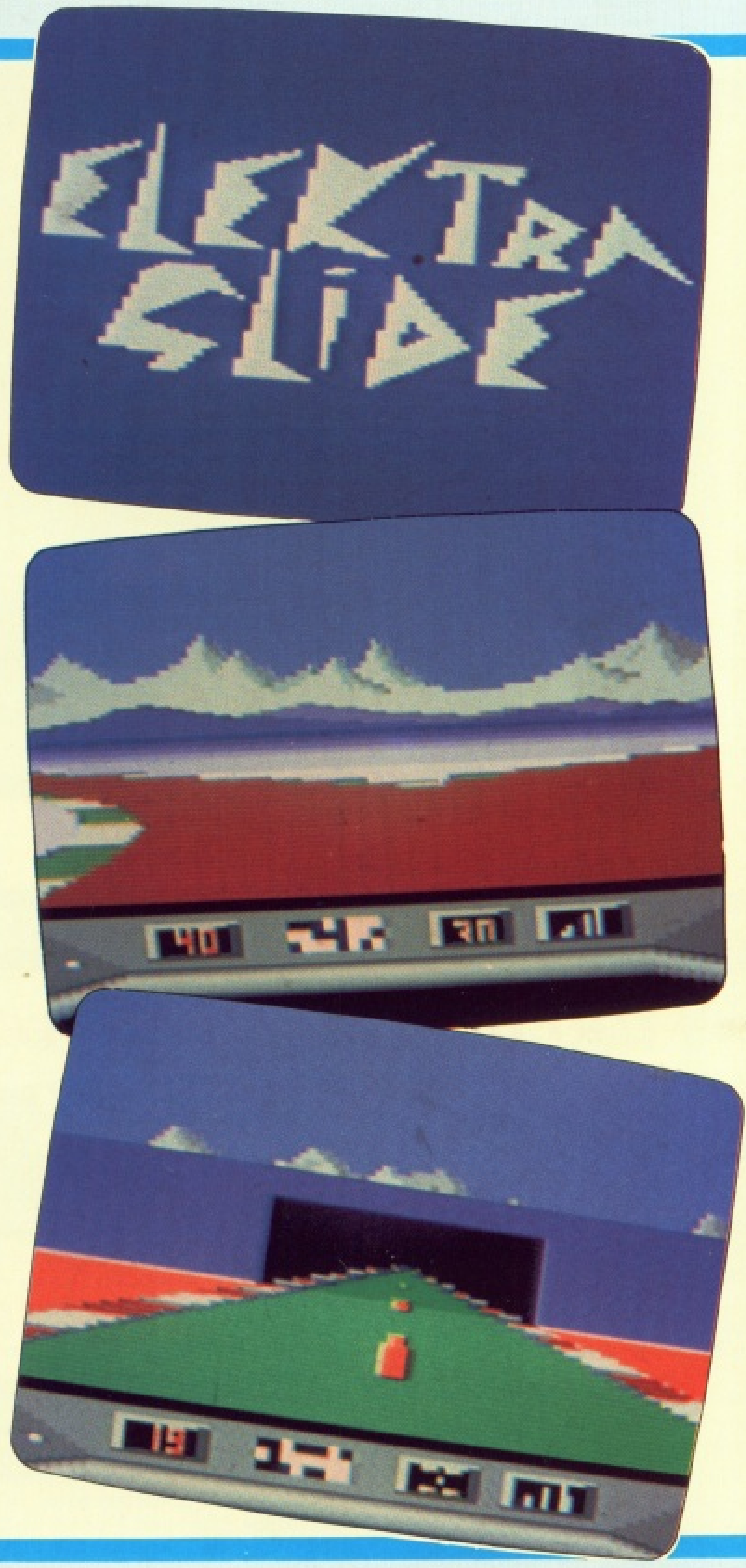
The ever-expanding ATARI USER needs more new writers and programmers.

If you think you can fit the bill – can write good English, have a working knowledge of the Atari range and/or feel at home among all kinds of programs – write to us sending a curriculum vitae and sample of your work to:

The Managing Editor
Atari User
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Do it now *– this could be your big chance to enter the exciting world of computer journalism!*

ATARI USER MAIL ORDER OFFERS



You'll be driven to distraction by

ELEKTRAGLIDE

– the new high-speed fantasy racing game from English Software suitable for all 48k Atari machines

... and you can

SAVE ALMOST £8

if you buy it at the same time as you take out a subscription to Atari User!

Our price:

£3.50 on tape *(RRP £8.95)*

£5.00 on disc *(RRP £12.95)*

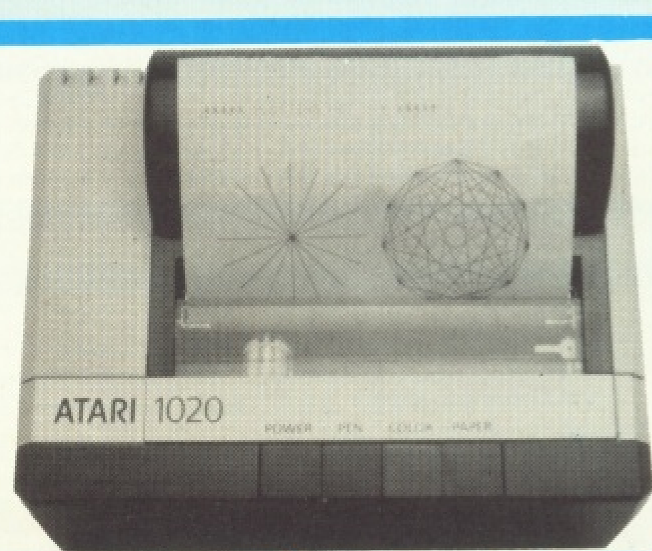
(Not available at these special prices without subscription)

Atari 1020 printer/plotter

The Atari 1020 comes complete with a power unit, input/output cord, 2 sets of pens, a roll of paper, an operating instruction book and a cassette containing demonstration programs.

Atari User price £75.79

Recommended retail price: £99.00



ATARI USER MAIL ORDER OFFERS

These back issues are still available



May 1985 issue: Profile of Jack Tramiel, preview of the new machines, Attack Squash, Adventuring, Alphabet Train, Hexer utility, Software reviews, Sounds, the 6502, Microscope, Atari Insights – Bit Wise, Beginners and Graphics.

June issue: Analysis of the 130XE, Submarine, Adventuring, Random numbers, Software reviews, Frog Jump, Microscope, Sounds, Atari Insights – Bit Wise, Beginners and Graphics, special 12 page feature on Communications.

July issue: Disassembler, Bomb Run, DOS 2.5, 17 Commandments, Adventuring, Display List Tutorial, Software reviews, Power Functions, Treasure Hunt, Keyboard Sounds, Microscope, Insights – Bit Wise, Beginners and Graphics.

August issue: Analysis of 520ST, program protection routines, Fruiti Gambler, Assembler, Touch Tablet programs, first look at Logo, Raider 1997, Dos 2.5 upgrade offer, Display List Tutorial, Microscope, Software reviews, Insights – Bit Wise, Beginners and Graphics.

September issue: 8-page special on the 520ST, Mode 8 screen dump routine, Maze Munch, Data Maker, Display List Tutorial, 68000 addressing modes, list processing with Logo, Software reviews, Insights – Bit Wise, Beginners and Graphics.

October issue: Computer Canvas graphics program, Updates for RAW 6502 assembler, 130XE Ram-disc utility, Hex/Ascii memory dump utility, Pontoon, Software reviews, 68000 operating environment, Wraptrap, Insights – Bit Wise, Beginners and Graphics.

November issue: Converse program, Bitwise operator utility, ST graphics examples, ST software list, Guy Fawkes game, Display List tutorial, Adventuring, Microscope, Software reviews, Insights – Bit Wise, Beginners and Graphics.

December issue: Check-sum program, Special keyboard characters, Basic XL review, GemWrite and GemDraw, Countdown game, Disco, Display List tutorial, Software reviews, Left-handed joystick, Adventuring, Beginners and Graphics.

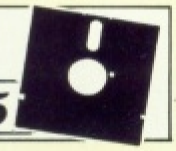
January 1986 issue: Machine code games, Pt. I, Atari in education, Sony ST monitor review, Hunchy game, Check-sum update, Listing utility, Dotsquare game, 1020 screen dump routine, programming in C on the ST, Adventuring, Software reviews.

Keying in long programs too much of a chore?

Then give your fingers a rest by sending for our monthly disc or cassette containing all the programs from each issue of Atari User. See order form opposite.



£3.95



£5.95

MAY: Alphabet Train: The combination of colour, sound and animation makes this early learning game a winner with the children. **Sounds Interesting:** Drive your neighbours potty with these ready-made sounds. **Hexer:** Enter, display and run machine code programs with this hexadecimal loader. **Attack Squash:** A fast-action game to keep you on your toes. **Reaction Timer:** See how fast your reactions really are. **Binary:** Convert denary numbers to binary notation.

JUNE: Frog Jump: Guide the frog across the road and river to his home in this version of the arcade classic. **1300XE Ram Power:** Use the extra 64k of memory to good effect, or use the drawing routines to produce some pretty displays. **Submarine:** Scuttle the submarines. **Etcha-Sketch:** Draw pretty pictures with only a joystick. **Random Numbers:** Get random numbers from machine code. **Filthy Fifteen:** Can you keep the Filthy Fifteen happy in their cells?

JULY: Bomb Run: Flatten the deserted city and land safely. **Disassembler:** Find out what's going on deep inside your Atari. **Treasure Hunt:** Use logical thinking to find the treasure. **Password Generator.** Keep generating passwords till you find one you like. **Keyboard:** Convert your micro into an organ. **Quasimodo:** Can you sort out the mess of ropes in the belfry?

AUGUST: Assembler: Make machine code programming easier. **Fruiti Gambler:** Save money with this fruit machine simulation. **Mandala:** Complex patterns made easy. **Protection:** Protect your programs from prying eyes. **Display List:** Demonstration programs. **Raider 1997:** Futuristic text adventure. **Touch Tablet:** Demonstration programs.

SEPTEMBER: Maze Munch: Help Horace the Blob munch the maze monsters' morsels. **Data Maker:** Convert your machine code routines to DATA statements. **Display List:** Demonstration programs. **Screen Dumps:** Dump your Mode 8 screens to a 1029 printer. **Bricks:** Solve the Bricks problem.

OCTOBER: Pontoon: Twist? Bust! **Memory Dump:** Examine memory in hex and Ascii. **Display List:** Demonstration programs. **Wrap Trap:** Action game for one or two players. **Computer Canvas:** Make your own micro masterpiece. **Assembler Update:** Improvements for the RAW assembler. **Ram Disc:** Make the most of the 130XE's extra memory.

NOVEMBER: Guy Fawkes: Help Guy escape from the guards. **Converse:** Teach your Atari to be a psychotherapist. **Display List:** Demonstration programs. **Bitwise Operators:** Utility to provide logical functions. **Circle:** Draw and fill a circle. ***Plus:*** Freebie of the month – **Creepshow** machine code pinball game.

DECEMBER: Countdown: Micro version of the famous TV game. **Get It Right!:** Atari User's own check-sum program. **Disco:** Son et lumière on your Atari. **List Utility:** Makes listing easier. **Display List:** Demonstration programs. ***Plus:*** Freebie of the month – **Jane's Program** machine code entertainment.

JANUARY 1986: Bells: Help Mr Humpy rescue Esmerelda. **Get It Right!:** Atari User's own checksum program. **Alien Attack:** The game to accompany the machine code series. **Lister:** Make listing programs easy. **Dots:** Play the micro or another player at this strategy game. **Dump:** 1020 printer/plotter routine. ***Plus:*** Freebie of the month – **Scramble Fighter** machine code game.

FEBRUARY: Horse Play: Knight's tour program. **Micropainter:** Programs to manipulate Micropainter screens. **Clock:** Interrupt driven clock utility. **Flasher:** Flashing colour utility. **Bounce!:** Simple to play, hard to master. **Bridge:** The thinking person's card game. ***Plus:*** Freebie of the month: **Demon's Lair** – an adventure game you may never escape from.

FREE

Can you escape from the Demon's Lair, this month's freebie? It's an adventure game with enough red herrings to start a fish factory.

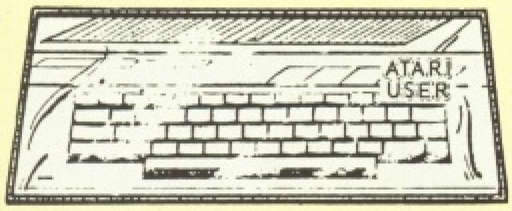
And remember, you won't find it listed in the magazine – it's only available if you buy the monthly cassette or disc.

See order form opposite.

Your Atari needs protecting

Now for the 800XL

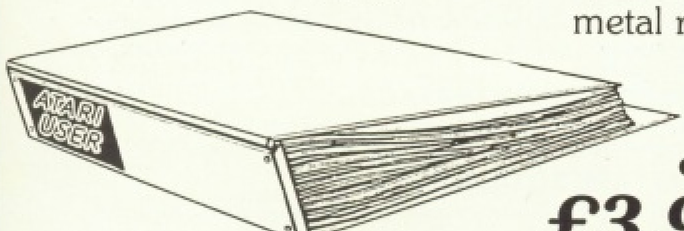
Protect your 130XE or 800XL with our luxury dust cover made of soft, pliable, clear and water-resistant vinyl, bound with strong cotton and decorated with the magazine's logo.



only **£3.95**

Keep your collection complete

Bound in chocolate brown pvc and bearing the Atari User logo, this handsome binder will hold a year's supply of the magazines firmly secured in place with metal rods.



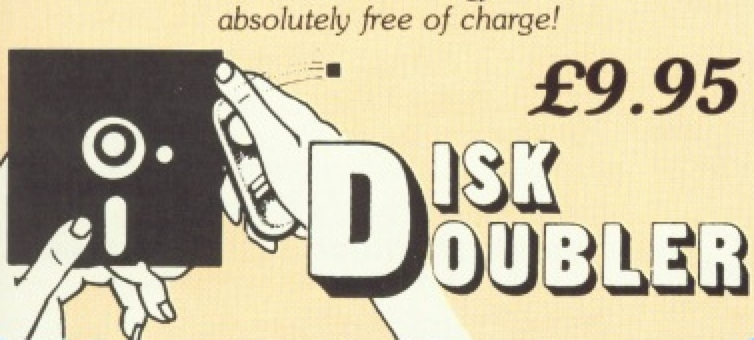
only **£3.95**

Double your disc capacity

Allows you to cut out a correctly positioned notch which will enable you to use BOTH sides of the disc – and HALVE your costs. Extremely well made to a compact design, it has a unique position guide to assure pin-point accuracy!

Order now and we'll also send you an Atari disc containing DOS 2.5 absolutely free of charge!

£9.95



ATARI USER ORDER FORM

All prices include postage, packing and VAT.
Overseas orders despatched by Air mail.

Valid to Feb 28, 1986

Please enter number required in box. (✓) £ p

Annual subscription

UK & EIRE £12 (sterling only)	7001	☐
Europe £15	7003	☐
Overseas (Air mail) £30	7004	☐

Commence with ______ issue

Add £3.50 (tape) or £5 (disc) to your subscription to receive Electraglide.	Tape*	7061	☐
	Disc*	7062	☐

*Only available if covered by subscription order.

Back issues

£1.25 UK & Eire
£1.75 Europe
£2.25 Overseas Air mail

May	7005	☐
June	7006	☐
July	7007	☐
Aug	7008	☐
Sept	7009	☐
Oct	7010	☐
Nov	7011	☐
Dec	7012	☐
Jan 1986	7013	☐

Monthly Cassette/Disc

Cassette
£3.95 UK
£4.95 Europe/Overseas

Disc
£5.95 UK
£6.95 Europe/Overseas

Month	Code	Tape	Disc
May	7017	Not available	☐
Jun	7018		☐
Jul	7019		☐
Aug	7020		☐
Sept	7021		☐
Oct	7122/7022	☐	☐
Nov	7123/7023	☐	☐
Dec	7124/7024	☐	☐
Jan 1986	7125/7025	☐	☐
Feb	7126/7026	☐	☐

T-Shirt

£4.25 UK
£5.25 Europe
£5.75 Overseas Air mail

Small	7047	☐
Medium	7048	☐
Large	7049	☐

Dust Cover

£3.95 UK
£4.95 Europe and Overseas

130XE	7031	☐
800XL	7060	☐

Binder

£3.95 UK
£5.95 Europe Overseas Air mail £6.95

7029 ☐

Disk Doubler + free DOS 2.5

£9.95 (UK & Overseas) 7051 ☐

1020 Printer/Plotter

UK only £75.79 7063 ☐

Learning is fun

Telly Turtle	tape £7.95	7055	☐
	disc £11.95	7056	☐
Simulated Computer	tape £7.95	7057	☐
	disc £11.95	7058	☐
Brain Strainers	disc £11.95	7059	☐

Overseas orders – add £1 p&p per order

Payment: please indicate method (✓) TOTAL

☐ Access/Mastercard/Eurocard

☐ Barclaycard/Visa

☐ Cheque/PO made payable to Database Publications Ltd.

Credit card expiry date /

Name ______

Address ______

Signed ______

Send to: *Atari User*, FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

(No stamp needed if posted in UK) *Please allow 28 days for delivery*

Orders by phone: **061-480 0171**
– by Prestel: **Key *89 Mailbox No. 614568383**
– by Telecom Gold: **Mailbox No. 72:MAG001**

Don't forget to include your credit card number and full address.

AT1

ADVERTISERS INDEX

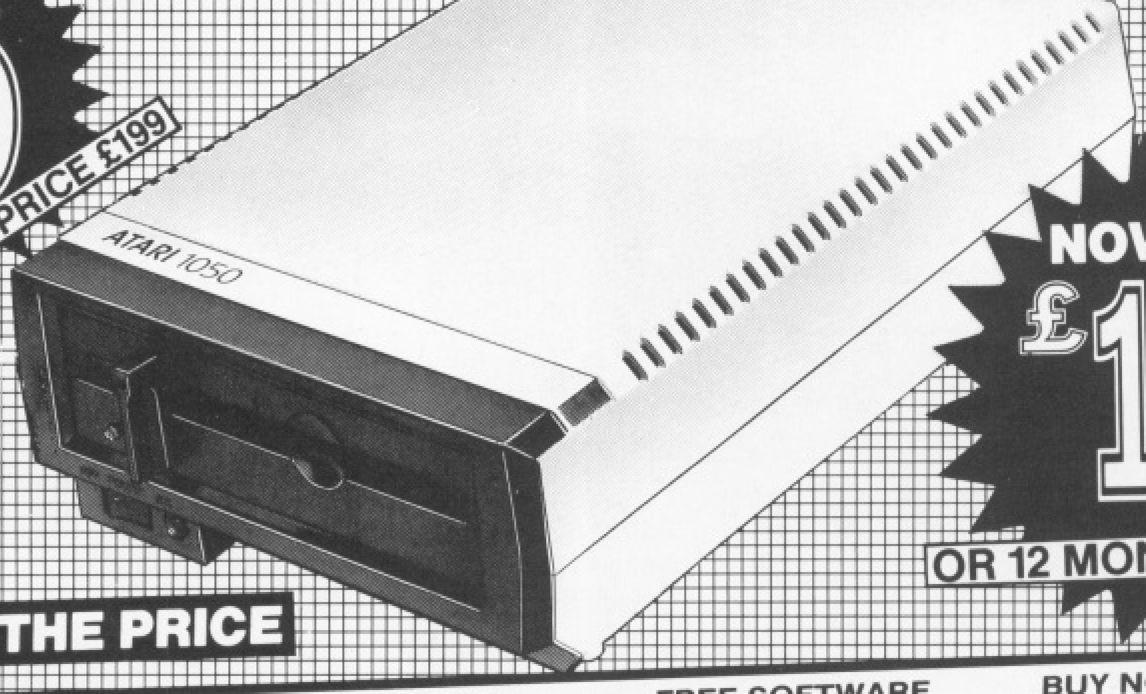
ATARI 1050 DISK DRIVE

WITH FREE SOFTWARE

WORTH £34.98

SAVE £70

PREVIOUS PRICE £199



NOW ONLY £129 inc VAT

OR 12 MONTHS AT £12.46

POWER

WITHOUT THE PRICE

NEWS FOR ATARI 8-BIT COMPUTER OWNERS

Silica Shop, the UK's leading Atari specialists, based in Sidcup Kent have announced a massive drop in the price of the Atari 1050 Disk Drive. The 1050 is compatible for use with the Atari 400/800 and XL/XE computers and allows access to a range of over 450 disk-based software titles. The 1050 comes with DOS 2.5, and can also be used with other Atari Disk Operating Systems, making it compatible with the complete range of Atari Corp and Third Party software for Atari 8-bit computers. The addition of a disk drive is a great enhancement to any computer system, increasing storage facilities and cutting information access time to seconds instead of the minutes taken by the 410 or 1010 data recorders. Many professional/business programs are only available on disk and not cassette. Until now, only a small proportion of Atari Computer owners have been able to benefit from the power and speed of the 1050. Now Silica are pleased to be able to offer the 1050 at a new low price of only £129 including VAT and FREE delivery. We also offer credit facilities allowing Atari owners to purchase it over 12 months for only £12.46 per month. The total purchase price over 12 months, with interest at a flat rate of only 16%, is only 12×£12.46=£149.52 (APR 32.3%). There has never been a better time for Atari owners to buy a Disk Drive!

SUPERB TECHNICAL SPECIFICATIONS

The 1050 is a dual density disk drive. This refers to the amount of information that can be stored on a single side of a disk. Three things determine the density of a particular disk format: The number of bytes in each sector, the number of sectors per track and the number of tracks per disk. Single Density formats give eighteen 128 byte sectors on each of their 40 tracks, thus giving a total capacity of 18×128×40 or 92,160 bytes. Double Density formats give sectors that are twice as large as the single density sectors and are capable of holding 256 bytes on each sector. This yields a capacity of 184 kilobytes per disk. There is also a third format, Dual Density which is the one used by Atari's new 1050 Disk Drive with DOS 3 and DOS 2.5. It has 26 of the 128 byte sectors on each of its 40 tracks, giving a total capacity of 133 kilobytes, which after formatting comes down to 127K. The 1050 is capable of running disks formatted in either single or dual density and can run either DOS 2, DOS 2.5, or DOS 3, this makes the machine completely compatible with all of the previous old style software. The 1050 is compatible with the 400/800 and the new XL/XE series of Atari computers. However, if you run a 400 or 800 you would need to already have at least 32K RAM of memory in your computer. The 1050 has a built-in 6507 micro processor and an onboard ROM operating system for automatic standby capability. It has automatic switching from single to enhanced density modes. It has a 'Disk Busy' indicator and up to 4 disk drives can be controlled at once. Included with the Disk Drive is the Owner's Manual, the DOS 2.5 Master Diskette, Reference Manual, I/O Data cable and Mains Adaptor. The 1050 disk drive comes with everything you need to plug it in and use it immediately.

FREE SOFTWARE

The new price for the 1050 disk Drive is not the only good news for Atari Owners. The Disk Drive now comes with three FREE software titles, in addition to the DOS 2.5 Disk and Manual. The first of these is The Payoff on disk, a new adventure game in which you play the leading role. On the reverse side of this disk is a demonstration program showing Atari's amazing sound and graphics. Also included is Home Filing Manager which will help you organise your files. It allows you to catalogue and file details of books, birthdays, your stamp collection or anything else which would normally require you to use filing cards. The software which comes free with the Disk Drive carries a normal retail price of £34.98 and is as follows:

HOME FILING MANAGER	£24.99
THE PAY OFF ADVENTURE	£9.99
DOS 2.5 DISK & MANUAL	FREE
SOUND & GRAPHICS DEMO	FREE
Normal cost of FREE software	£34.98

FREE POST & PACKING

Mail Orders to the UK and BFPO are sent from Silica with post and packing FREE. We provide a 24 hour service and aim to despatch orders on the same day that we receive them.

12 MONTH GUARANTEE

The 1050 Disk Drive comes with a full 1 year guarantee. Silica will replace any faulty 1050 Disk Drive with a new unit within this period.

BUY NOW - PAY LATER

To help you to take advantage of the new low price of the 1050 Disk Drive, we have now negotiated favourable credit terms with HFC Trust. You do not need a bank account to take out credit with HFC, and no deposit is required. Repayments can be made by post, standing order, or personally at your local HFC office. If you wish to use these facilities, simply complete and return the coupon below. We will then send you further details and an application form by return of post.

OUR SPECIALIST SERVICE

We are now firmly established as the UK's NUMBER ONE Atari specialists, so when you buy an Atari computer product at Silica you will be fully supported. Our mailings keep you up to date with news of software releases and developments. Our technical support team and sales staff are at the end of the telephone line, to deal with your problems and supply your every need. We aim to stock all available Atari hardware, software, peripherals and accessories. We also stock a wide range of Atari dedicated books and magazines. Here are some of the many facilities we can offer:

- ★ FREE POST & PACKING ON MAIL ORDER
- ★ FREE NEXT DAY SECURICOR DELIVERY
- ★ INFORMATION MAILING SERVICE
- ★ TECHNICAL SUPPORT TEAM
- ★ HIGHLY COMPETITIVE PRICES
- ★ AFTER SALES SUPPORT SERVICE
- ★ REPAIR SERVICE ON ATARI PRODUCTS

ORDER NOW - OR SEND FOR A CREDIT APPLICATION FORM

Silica Shop Limited, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Telephone: 01 309 1111

HOTLINE!

If you can't wait to get your hands on a brand new 1050 Disk Drive for your Atari 8-bit computer and you have a credit card or charge card, phone our hotline now! We accept Access, American Express, Barclaycard, Diners Club, Mastercharge and Visa. Telephone our hotline with your card number and your address details and we will dispatch a disk drive to you TODAY! You can also call the hotline to request a credit application form if you wish to take out credit facilities with HFC Trust.

☎ 01-309 1111

1050 ORDER FORM

To: Silica Shop Ltd, Dept WMI 0186, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

Please send me .... **1050 Disk Drive(s) at £129 each**

Mr/Mrs/Ms: .... *Initials:* .... *Surname:* ....

Address: ....

Postcode: ....

☐ **I enclose a cheque:** for £ .... (made payable to Silica Shop Ltd)

☐ **Please debit my credit card:**
CREDIT CARD NUMBER: .... £
We accept: Access, American Express, Barclaycard, Diners Club, Mastercharge, Visa

☐ **I wish to pay by credit:** (12 monthly credit instalments)
Please send me written details and an application form

What's on the desktop?



K SPREAD
Spreadsheet

An easy-to-use Spreadsheet enjoying the benefits of the user friendly *GEM system with it's mouse-driven icon selection and multi-window presentation.

This professional package combines full use of the ST's large RAM capacity with its fast processing speed and facilitates easy data transfer with the KUMA word-processing, database and communications packages.

NEW ★ NEW ★ NEW ★ NEW ★ NEW ★ NEW ★

K SEKA
Assembler

(Sixty-eight K Assembler) – The fast and easy-to-use assembly system for the generation and analysis of 68000 code programs, combining full use of the ST's large RAM capacity with an impressive list of useful features.

K RAM
RAM Disc

Enables one or more RAM discs to be set up as high speed "floppy discs". The spectacular improvements in the speed of file handling are immediate! – files are accessed and written to between 40 and fifty times faster.

Get down to business with Kuma ~ first off the mark for the ST

Available from your ST-Dealer

Kuma Computers Ltd., Unit 12, Horseshoe Park, Horseshoe Road, Pangbourne, Berks RG8 7JW.

Please send further details of the Kuma ST range.

Name ....

Address ....

....

.... Phone.....................

Trade Enquiries Phone 07357-4335

AT2